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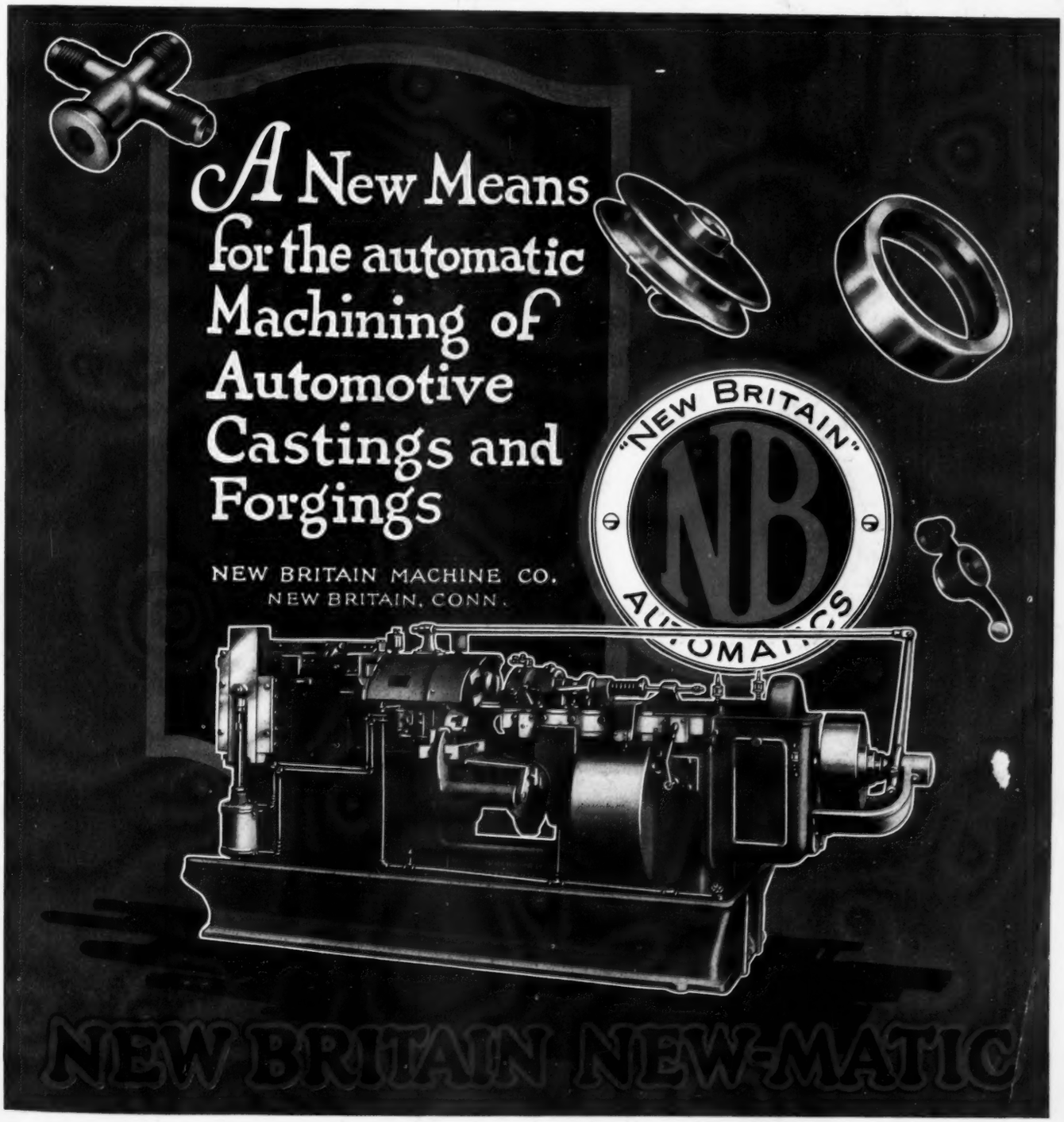
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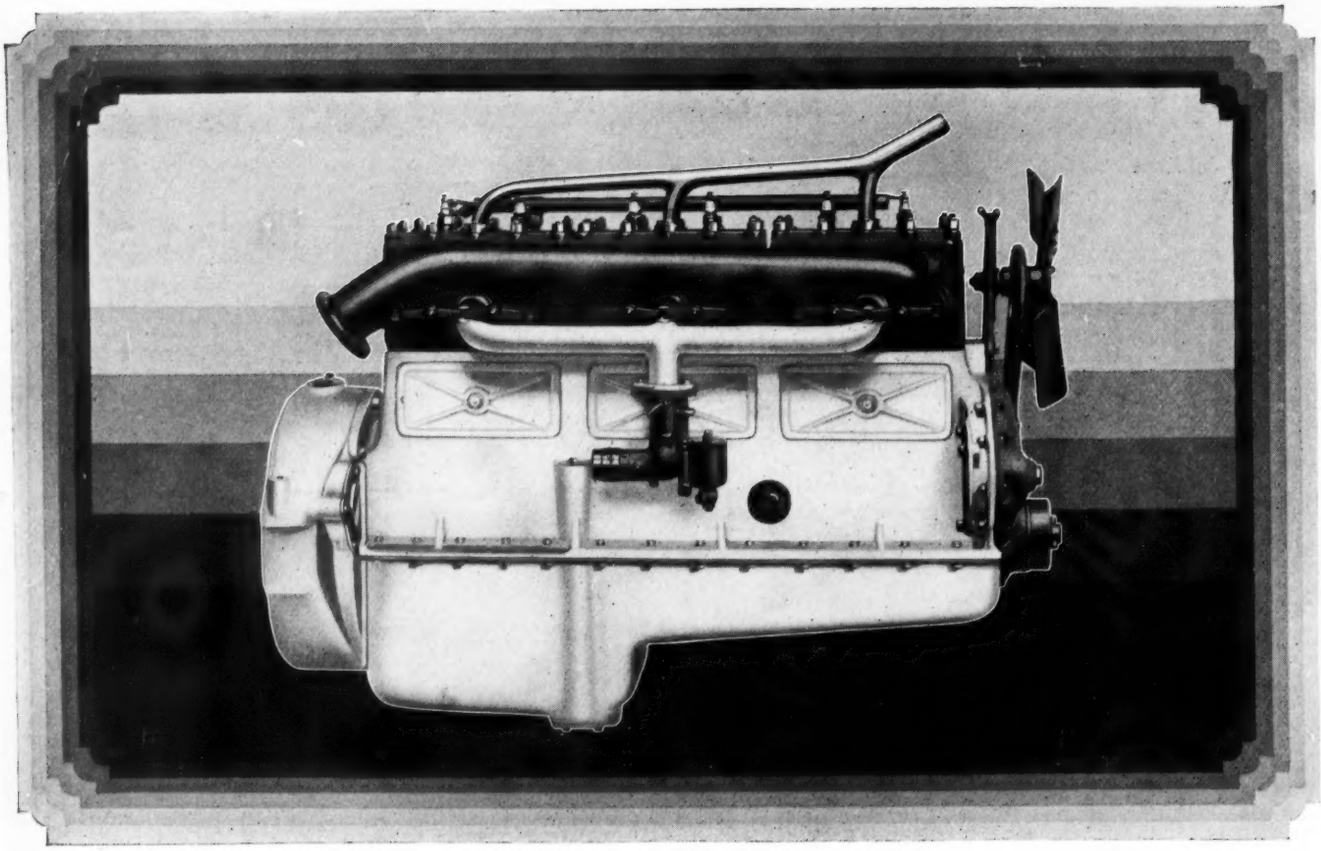


THERE exist but few contributions of greater importance to the automotive industry than that of the Waukesha Motor Company in the development of its Ricardo Head Engines.

And now comes the 100 H. P. and 75 H. P. 6 cylinder Ricardo Ell Head Engine for Busses.

In design, in power, in speed, in economy, in flexibility and in immunity from the destructive effects of detonation under all loads and speeds, it represents an achievement that marks the beginning of a new epoch in motor bus transportation.

WAUKESHA MOTOR COMPANY

Engine Builders

Waukesha, Wis. **New York City**

The Ricardo Head

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. 52 NEW YORK—THURSDAY, JANUARY 22, 1925 No. 4

Turn the Spotlight on Your Dealer Educational Work

"More field men and less general advertising," urges one executive. "Cut merchandising waste," suggests another. Future work must get down to brass tacks, is general view.

By Norman G. Shidle

"WE ought to take about one-third of the money we spend in national medium advertising and in direct-by-mail literature and spend it on factory traveling men who really know the retail field and who can give some practical help to dealers. We should make it possible for these men to spend several days instead of several hours with each dealer. They should be given time to find out what the dealer's problems are and should be capable of helping him to solve them."

That's the gist of what one of the most prominent factory merchandisers in the automobile business told us the other day, when we asked him how dealers could be made into better business men. This man has sold successfully many kinds of automotive products. His name is familiar to every man in the industry. And he has lost faith in the efficiency of purely inspirational sales efforts.

He thinks that factory sales managers will have to work more with facts and less with oratory in the future.

Consider the Cost

"BUT the cost," we protested. "To carry out any such plan as you have outlined would double or triple in most cases the money being spent for factory traveling representatives. Wouldn't you be likely to increase selling costs considerably? Aren't they high enough already?"

"Increase costs nothing," he replied. "As I have said, the extra money invested in these practical factory salesmen could readily be taken from some of the more indirect sales efforts now used constantly. We're out to sell automobiles. That's our business in the end, isn't it? Well, more money in traveling men and less in general media and direct-by-mail literature will increase sales. Mark my words.

"I don't mean that general advertising and direct-by-mail efforts aren't worth while. They are. But I do think that the money spent in automotive marketing has been badly distributed in the past. We haven't given every dollar a chance to do its best work."

Something to Think About

WELL, that's something to think about, isn't it? Particularly because the same ideas are advocated by at least two other equally prominent automotive marketing experts.

But increasing the number of traveling men alone doesn't constitute a solution to the dealer education problem. Probably this phase of work has not had enough attention in the past, but fundamentally, the efficiency of the operation rather than the volume of effort will determine success or failure.

In dealer education, as in almost every form of human activity, achievement depends about 20 per cent on the method chosen and about 80 per cent on the efficiency with which the work is carried out. One hundred capable traveling men can do more to increase dealer efficiency than one thousand order-takers who lack the ability to do a really constructive educational job.

Consequently, the first step in any program which contemplates greater use of factory traveling men must consist of acquiring and training the necessary

personnel. Just such a plan is being evolved by one big organization today. Many of the field men now employed will be given special training and others will be added, but will not be sent out until they have been properly equipped for the new type of work.

The relative importance of the efficiency of operation and the choice of method always must be given primary consideration. Doubtless a good deal of money has been wasted in advertising of all kinds. But the waste has resulted from improper utilization of the method in many more cases than from the fact that the method itself was the wrong one to employ.

One thing is certain. Supervision and education too often are confused. Some companies have worked on the plan that education consists in telling the dealer how the factory wants things done and then seeing to it that he does them that way. Others operate on the idea that if the dealer is grounded in the principles of good business management he finally will so develop his own abilities as to be able to handle more efficiently the various problems which confront him from day to day.

These two points of view are the same as those which are conflicting in general education in this country. Shall the student be taught *what* to think or shall he be taught *how* to think? Shall the teacher attempt to develop the individual so that he can act as soon as possible without supervision or shall he simply try to make him proficient in following orders which will forever emanate from the teacher? Which system is the more costly?

The "what" method probably brings results more quickly than the "how." Certainly it has proved highly successful thus far in one or two outstanding automotive instances. Learning "how" always is much more difficult than learning "what." At the same time the man who has learned "how" eventually relieves the factory of much of the supervisory cost. The man who learns only "what" always is a considerable expense.

Maximum efficiency in any organization can result in the long run only when each individual in it assumes a high degree of personal responsibility. While better immediate results sometimes can be obtained from close supervision and direction, the cost of supervisory activities mounts as self-reliance on the part of individuals decrease.

The dealer who relies permanently on the factory for direction as regards the details of his business always will be an expensive dealer to have. The longer he leans on the factory, the less able he becomes to stand on his own feet—and the more costly the factory supervision becomes.

The problem of dealer education is much the same as the problem faced by every executive when he takes on a new assistant. For some time the executive will find it quicker to do many details himself than to explain and help his assistant to do them. If the executive refuses to take the preliminary time and trouble necessary to train the assistant, he finds himself permanently burdened with a mass of detail which hampers him in the accomplishment of broader work. In the end the assistant has to learn to stand on his own feet if he is to serve the purpose for which he was hired. Relations between the dealer and factory are analogous.

Teaching "what" gets quick, low-value results. Teaching "how" achieves permanent and valuable results.

Practical considerations, of course, must govern action in any individual case. Operation on the "how" system assumes for a given factory possession of a fair number of dealers capable of becoming real merchandisers.

Probably no retail organizations are built entirely of men of this character. It has been said, and probably with truth, that "the automobile industry isn't suffering from lack of dealers. What it lacks is enough good dealers." Like every other industry it has only human beings with which to work. Consequently, a certain amount of factory supervision probably must be considered as a permanent part of any dealer relations scheme.

Costs can be reduced in the long run, however, only if the factories urge every dealer to function independently insofar as his personal capabilities permit. The expense of education necessarily will be higher than need be if the assumption be made that all dealers always have to be supervised and directed to the *n*th degree.

THIS article tells of some plans now under way to cut the cost and increase the efficiency of dealer educational work. It is the twelfth in a series on "Profits vs. Volume."

"Take some money out of general media advertising and direct-by-mail efforts and put it into more and better factory traveling men," is the answer of one executive to the question, "How can dealer educational work be improved?"

But he agrees with other experts that the efficiency with which a given method is used has more effect on the results than does choice of the method.

New Instruments Measure Vibrations of Various Engine Parts

Devices developed by General Motors Research Laboratories give permanent records of both linear vibrations due to unbalanced forces, and torsional vibration of crankshaft.

C. E. SUMMERS of the Special Problems Section, General Motors Research Corp., presented a paper before the Society of Automotive Engineers at their annual meeting, Detroit, Jan. 19 to 22, on Measurement of Engine Vibration Phenomena in which he described three new instruments used for measuring the vibration of various engine parts. One of these (Fig. 1) carries a plunger which may be held against any object the vibration of which it is desired to determine. The motion imparted to the plunger is multiplied seven times in its transmission to a brass needle, which contacts with chemically treated indicator paper and leaves thereon a record of the vibration. The paper is carried by a governor-controlled, spring-driven drum, which, when tripped by the operator, makes one revolution at uniform speed. The indicator card, therefore, shows a space-time chart of

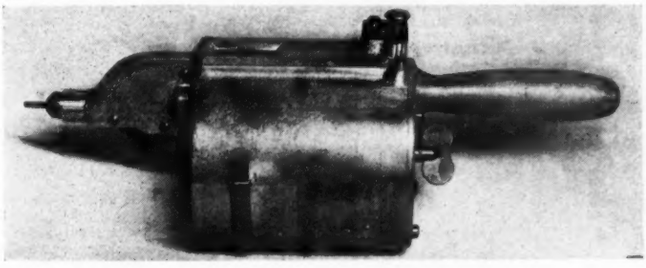


Fig. 1—Vibration-recording instrument

the vibration, together with its amplitude, frequency and wave character. The instrument is capable of following vibrations up to 300 per sec. with accuracy.

Sometimes it is desirable to know the relation which a certain vibration wave bears to some definite part of the cycle. In order to secure this information the instrument is provided with a quick-acting electro-magnet which operates a second brass needle bearing on the indicator card. The winding of the magnet is connected to a battery through a contact which establishes current at some known point in the cycle, thereby shifting the brass point suddenly to make a jog in the line. From this reference line all of the vibrations recorded can be studied in their relation to the movements of the parts of the engine.

An instrument has also been developed for recording torsional vibration of the crankshaft. It consists essentially of a shaft capable of being coupled rigidly to a crankshaft, a disk keyed tightly to the shaft, and a spring-driven flywheel floating on the shaft. With the instrument in position and torsional vibration in the crankshaft, the action of the indicator will be as follows:

The rigidly mounted disk vibrates with the crankshaft; the floating flywheel rotates at substantially constant speed and the relative motion of these two members is multiplied by and transmitted through a system of links to a stylus carrying a white disk. The displacement of this disk is approximately radial and is representative of the torsional vibration.

Frequency and Amplitude

When the engine is running at constant speed and there is no torsional vibration, the white disk describes a circle, but when there is torsional vibration of the crankshaft and angular displacement between the disk and the flywheel the white disk moves in and out while rotating. Since torsional vibration is of an harmonic type, it repeats itself, making the path of the white disk depart from a true circle in proportion to the intensity and frequency of vibration.

Frequency of vibration is the product of the number of waves and the engine speed. Amplitude of vibration is proportional to the distance between the peaks of the waves and a true base circle. When it is desired to make permanent records of the vibration of a crankshaft in operation an indicator card of the specially prepared paper

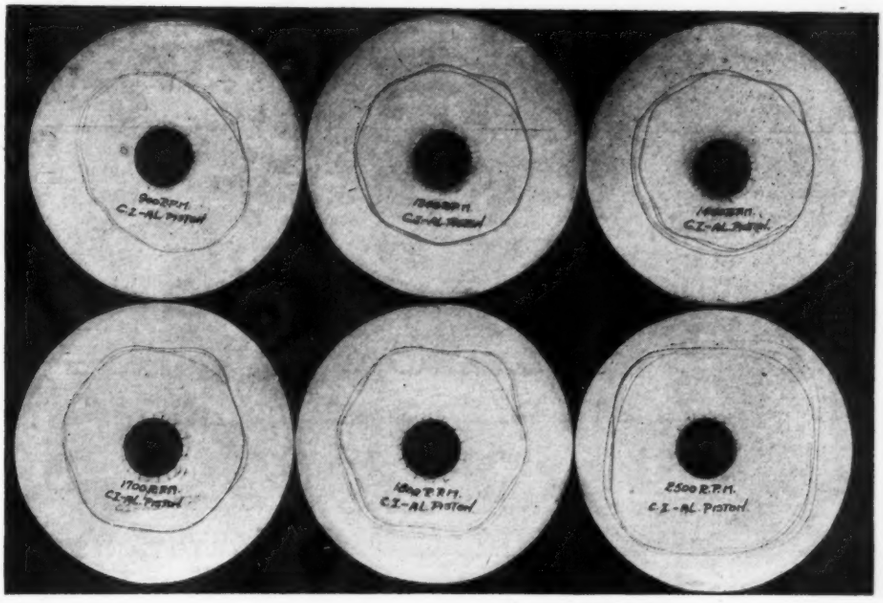
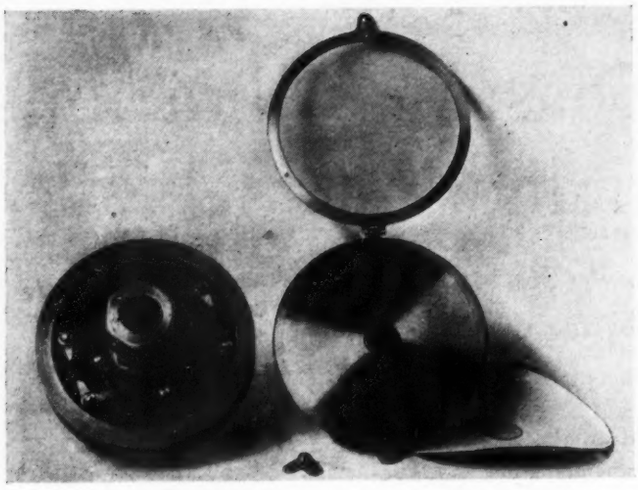


Fig. 2—Group of records made by the instrument



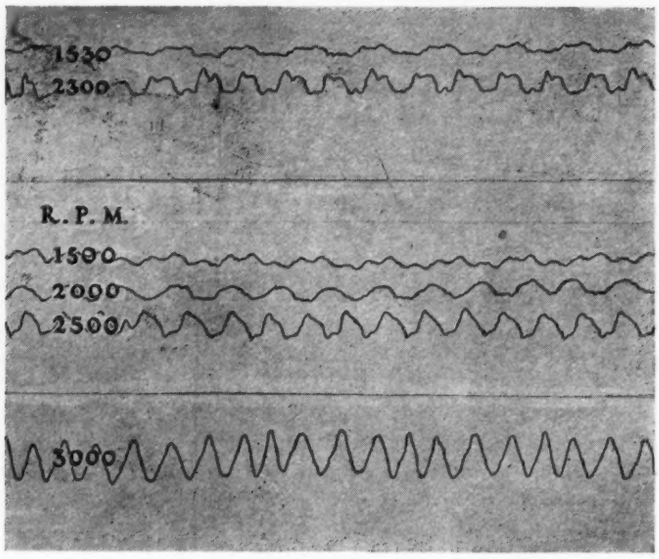


Fig. 3 (above)—Torsional vibration indicator and recorder. Fig. 4 (right)—Torsional vibration records of a typical four-cylinder crankshaft

referred to in connection with the former instrument is brought into contact with the stylus which registers a trace. These records may be preserved for study and comparison.

An electrical instrument for measuring torsional vibration has been developed by the Electrical Section, and is valuable in making detail studies of individual vibration waves in their relation to the movements of the pistons. The instrument is made as follows: An armature, having six pairs of windings, is mounted rigidly on a shaft which is connected as an extension of the crankshaft. A relatively heavy brass ring, carrying permanent magnets which terminate in six poles, floats on ball bearings and is driven through weak springs. Any torsional vibration in the crankshaft results in a displacement between the windings of the armature and the poles, which movement induces electromotive force in the windings. These windings are connected to the rings, which, through suitable brushes, establish a circuit through an oscillograph, causing a deflection of the instrument that is proportional to the current, the current in turn being proportional to the rate of angular displacement between the poles and the windings. Suitable calibration curves enable the operator to translate the diagram into terms of frequency and amplitude of torsional vibration.

The rate of vibration of the crankshaft assembly—namely, the crankshaft, connecting-rods, pistons and other parts—is as definite as that of a tuning-fork. As soon as one period is located, all the others can be determined readily. In practical crankshafts, the first harmonic is

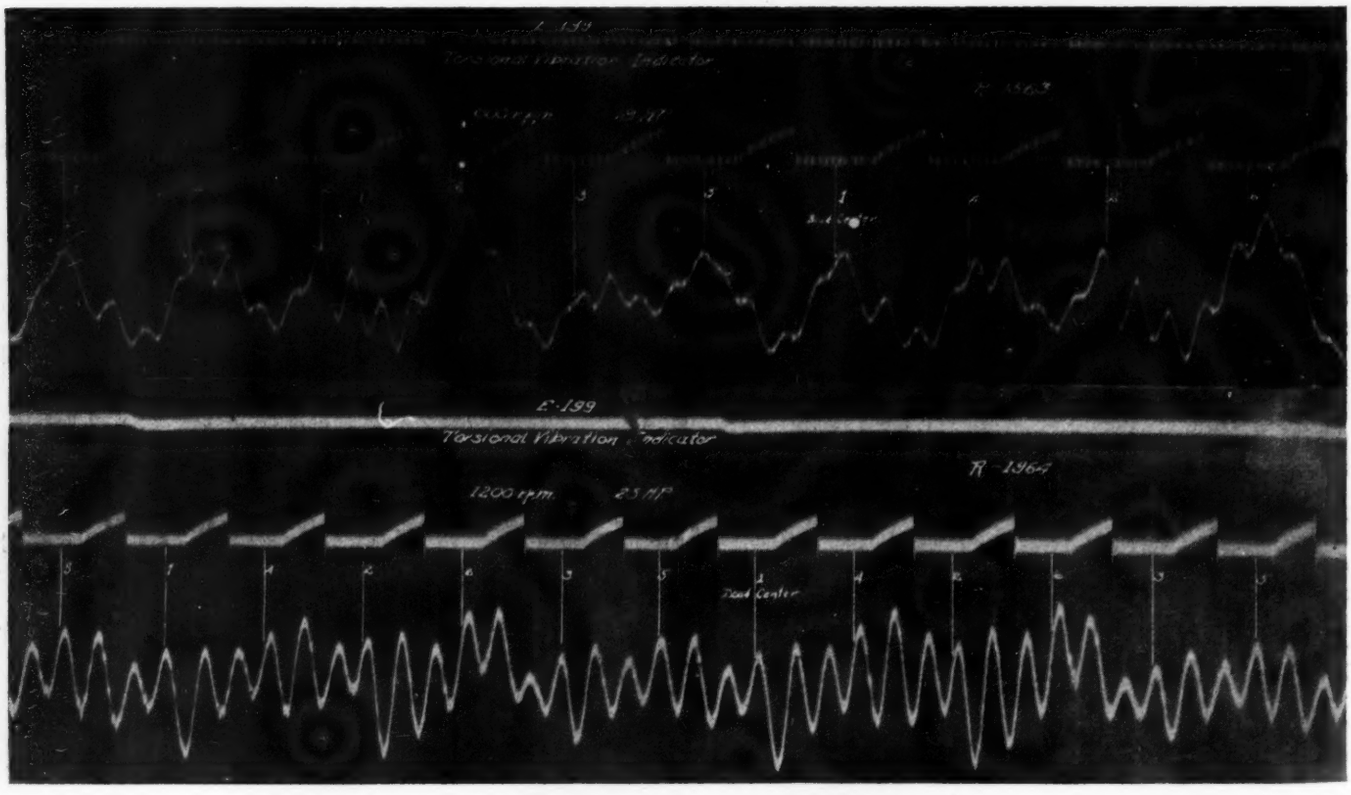


Fig. 6—Set of indicator cards taken from a crankshaft in which the natural frequency of vibration is sufficiently low to permit the occurrence of four periods

very seldom reached, since it would occur at a speed of from 3600 to 5000 r.p.m. The point at which the various periods occur along the speed range is a function of the torsional rigidity of the shaft and the effective moment of inertia of the shaft assembly.

The frequency of torsional vibration in the crankshafts tested ranges from 180 to 250 cycles per sec. The amplitude of torsional vibration in practical engines operating in the second harmonic ranges from 0.01 to 0.03 in. at crankpin radius. Experimental engines which have been pushed up into the first harmonic have shown as much as ¼ in. deflection at crankpin radius.

Fig. 6 shows a set of cards taken from a crankshaft in which the natural frequency of vibration is sufficiently low to permit the occurrence of four periods. The relative amplitudes of these periods, as taken from the cards, with the car and engine speeds, is shown by the insert below the indicator cards.

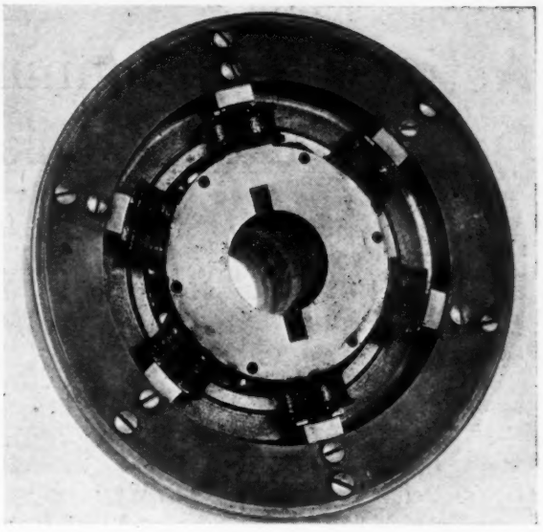


Fig. 5—An electrical instrument for measuring torsional vibration.

ACCORDING to an announcement of the Belgian Minister of Finance, on Oct. 1, 1924, there were registered there 39,845 passenger cars, 16,390 commercial cars, 6997 trucks and tractors and 23,707 motorcycles.

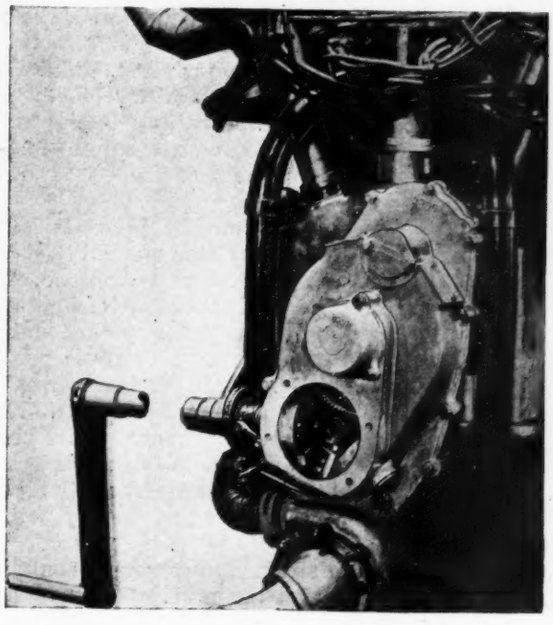
Inertia Type Starter for Aircraft Engines Developed

AN inertia type starter for aircraft engines now is being marketed by the Aeromarine Plane & Motor Co. of Keyport, N. J. This device consists of a small flywheel, suitable gearing, a clutch and a hand crank by means of which the flywheel can be revolved at a speed of several thousand r.p.m. When this speed is attained —an operation requiring a fairly husky man 20 to 30 sec.—a toggle operated clutch is engaged and the energy stored in the flywheel thus is applied in cranking the engine to be started.

A slipping clutch which can be set for any desired maximum torque is used to protect the device from injury due to backfire, as well as to limit the torque applied in cranking the engine. This mechanism is intended for use in starting engines of 600 hp. or less and is said to crank at three to four times the speed of electric starters and 12 to 15 times the speed of hand starters employed for similar service. It will give the engine from three to eight quick revolutions.

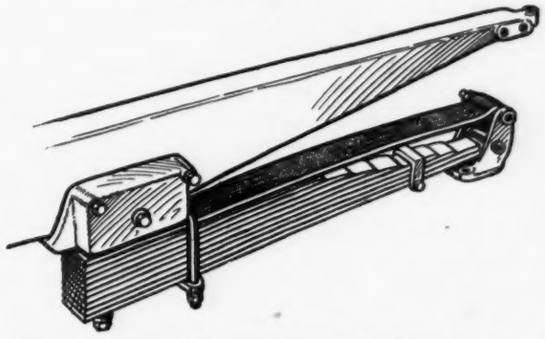
A two-stage gear train giving a total reduction of 133 to 1 is used between the flywheel and the crank. These spur gears are connected to the crank by a pair of bevel gears so that the axis of the crank is at right angles to the crankshaft of the engine and can be carried as far to the side of the engine as desired.

All gears are fully inclosed by an oil tight casing and are mounted on ball bearings. A ratchet is provided on the shaft of the hand crank.



Aeromarine inertia starter for aircraft engines

Quarter-Elliptic Spring Adapted for Front Brakes



Extra leaf used by Wolseley to render quarter-elliptic spring suitable with front-wheel brakes

INHERENT unsuitability of quarter-elliptic springs for use with front-wheel brakes is claimed to have been overcome by the Wolseley Co. (England) by the arrangement shown in the accompanying sketch. The additional fittings indicated now are being applied to the 16 hp. model—which has quarter-elliptics front and rear—in cases where four-wheel braking is required by purchasers.

As will be seen, a separate leaf of heavy section is located above the main spring, anchored above the latter in the frame bracket at the rear and secured in front by a pivot bolt passing through an eye of the leaf and a special bracket.

Active City Planning Body Needed in Every Town, Packard President Says

Hoover conference gave impetus to traffic safety work. Final solution lies in individual communities. Opinions from 233 municipal engineers indicate methods needed to solve problem.

By Alvin Macauley
President, Packard Motor Car Co.

WITH the closing of the National Conference on Street and Highway Safety in Washington a few weeks ago, new vigor has been given to efforts toward solution of the nation's vital traffic problems. Not only has the attention of the country been focussed on these problems, but definite steps have been taken to remedy conditions. All interests involved took active part in its deliberations and the resulting recommendations are broad in scope and broad-minded in vision.

It is vital that interest should not be allowed to die out in talk and that whatever has been learned should now be put to use.

The automobile industry has reason to congratulate itself on the leading part which it has played in initiating national cooperative effort toward the solution of traffic problems. The N. A. C. C. is to be congratulated on its effective activity and the industry is certainly indebted to George M. Graham, chairman of the Traffic Planning and Safety Committee of the N. A. C. C., for his unremitting labors and vigorous presentation.

> "CONGESTION will not be remedied until every automobile owner accepts it as his own problem—just as much his own problem as his license or a leaking radiator on his car."

But the brilliant success of the Washington conference should not be allowed to dazzle us into neglecting further efforts. After all, the traffic problem is a local one. It will handicap further work if the man in the street and the man in the automobile—as well as the man in the city hall—feels that somehow, by some black magic or White House magic, his traffic problem will solve itself.

Thinking down to the bottom, we realize that congestion will not be remedied until every automobile owner accepts it as his problem—just as much his own problem as his license or a leaking radiator on his car. And before that, every automobile dealer should accept it as his problem. And before that, every automobile manufacturer should accept it as his problem.

If we each of us realize it as our own individual problem, we shall all feel it our duty to work together for its solution.

It does not seem credible that the automobile industry and the automobile owner should have failed to learn the obvious lesson from the burdensome tangle of restrictive legislation which now surrounds them.

As traffic congestion grows, regulation and restriction increase.

As automobile use is handicapped, so inevitably must automobile selling and automobile production be handicapped.

It has been suggested that in each city the automobile distributors should form an active committee on traffic, and its first function should be to bring the question before the local business organizations. These organizations, whether it is the chamber of commerce or the luncheon clubs, should be urged to organize a traffic committee or help vitalize an existing one. Such plans should produce results.

When these are in action the next step is a campaign of public education through meetings and the newspapers, with the main object in view of having the city administrative body formally institute a City Traffic Commission, if none exists. If there is already a City Planning Commission which is inactive—and, unfortunately, sometimes it is—the campaign of education should arouse it.

Just what are the traffic problems? Where will their solutions be found?

Last spring the writer made a survey of these problems by gathering first-hand information from the city engineers of some two hundred and thirty municipalities of various sizes over 10,000 population. Nobody would have expected to find such a prevailing feeling of pessimism among technical officials as was expressed in the data submitted—or such a record of inadequacy in real activity.

There is little doubt, after studying this material, that the traffic problem is the most acute and difficult one with which the cities have at present to contend. Water supply, sewerage, street paving—these are comparatively simple and their technique has been worked out and, if a city is willing to pay, it can solve these problems definitely and continuously. Even "crime waves" can be stemmed, and public health can be bought. But in many cities only the utmost intelligence, effort and expenditures can be of substantial help in the traffic situation. And, in a few years, if they are not available soon, even unlimited planning, action and money will not avail.

Most of the 233 municipal engineers who contributed to this survey reported that the principal thoroughfares in their cities were badly congested. In all but a very few cities the width of the streets was never designed so

that they could bear safely and comfortably even a small proportion of the traffic which uses them. Business streets, as compared with main thoroughfares, are wider than average in only about 25 per cent of the cities and are narrower in about half the other 75 per cent. As a result, parking conditions are well-nigh hopeless.

When the cities were confronted with growing traffic problems a few years ago, the police departments assumed charge. The congestion was slight compared to what it is now and regulatory measures were simple—and seemingly effective. In most cases, while the engineers feel that the traffic problem is really an engineering problem, they find that it is still in the hands of the police department. Traffic rules, one-way streets, signal towers—they worked at the beginning, and apparently the prevailing theory is that as traffic congestion increases, all that is needed is simply more rules, more one-way streets and more signal towers—and bigger traffic courts.

The police officials and their advisors in many of the large cities have used commendable ingenuity and patience in untying traffic tangles and inventing schemes for preventing them. But the end of such measures is near—what is now needed is engineering ability and not police power.

The automobile industry need have little fear that regulation will go "beyond the limit." The big cities probably will never forbid the use of automobiles in congested sections—they will not have to. Already the New York subways are urging automobile owners, through advertising, to park their cars out of the theater and shopping centers and go downtown by train. As a matter of fact, many motorists have been doing that for months.

Problem One of Streets

When the cities and their traffic commissions begin to find that the traffic problem cannot be solved by putting drivers in jail, they will turn their attention to the streets.

As the engineers point out, traffic congestion can be relieved by expanding intersections, "separating" grades, rounding corners, eliminating obstructions. Even better results can be obtained by intelligent and liberal repaving of streets which are not being used because of poor pavement, thus multiplying the traffic lanes.

Beyond that—and a large proportion of the cities are already beyond that—comes widening of streets. About a third of the cities which reported in the survey already have had to widen their streets and about a half realize that they must spend millions in such widening.

Even the widening of existing streets is not the full answer, and on this point we have the frank statement of the city planning engineer of Minneapolis: "Increasing traffic cannot always be adequately provided for by street design in existing cities, and each street system will gradually reach a saturation point." And the city engineer of Seattle says: "I could take a map of Seattle and show you a possible, indeed, immediately probable, traffic in many directions from six to ten times the maximum capacity of all the streets that could possibly serve it."

It is clear from the reports that the traffic tragedy of American cities will be that the smaller cities will repeat the history of the larger ones—unless they learn the lesson from the experience of the others.

How many cities will go through the whole story of traffic rules, mechanical regulation, minor street improvements and costly street widening?

How many will go through all these stages, remedies lagging a few years behind the troubles at every stage?

Is it necessary—must the cities and the automobile industry suffer these growing pains?

It is difficult to read the record and believe otherwise, but for those who have faith and express it in works, it is possible to avoid the worst of these problems. However it may be with the larger cities, the smaller ones still have it in their power to detour much of the trouble.

But as long as they think of the traffic problem in terms of automobiles only there will be no hope. The traffic problem is the city planning problem. It is perhaps even more important in laying out the streets of a city to foresee the traffic which is going to use them than it is to foresee the structures which are going to be built along them.

And it is possible to foresee—even to determine by regulation—what parts of the city shall be used for various purposes—and therefore to foresee and determine the type of traffic which will and should use the various thoroughfares connecting those sections.

Only a handful of city engineers report that traffic studies are being made by experts with a view to city planning. In only 25 per cent have any traffic counts been made at all from the broader aspect. And yet nearly half the cities reporting have "city planning commissions."

Here, then, is the most serious danger of all, should the program of action be successful to the point of organizing traffic planning commissions.

The traffic commissions should not be allowed to pass into a state of blissful futility as have a majority of the city planning commissions.

Traffic plans and designs should not be allowed to gather dust in the archives of city halls.

They should be put into practice, and the only way that can be accomplished is to "sell" them to the people and to the public officials by every possible means of education and publicity—sell them vigorously and continuously until the plans are realized and all preventive measures in operation.

German Imports and Exports

IN spite of the embargo no fewer than 2070 automobiles were imported into Germany during the period January-May of last year, as compared with 283 during the same period of the year before. The largest number of cars (752) came from Alsace-Lorraine, whence cars are admitted free of duty. From Austria 676 cars were imported, from Italy 154, from France 26 and from other countries 462.

The German exports during the same period consisted of 705 cars, as compared with 2275 during the same period the previous year. Thus the exports of passenger cars were less than one-third as great as formerly, while the imports were more than seven times as great. The value of the exported cars was 4,651,000 gold marks, while that of the imported cars was 15,904,000 gold marks. Among the chief markets for German passenger cars are Holland, Switzerland, Austria, Hungary and Sweden, these countries ranging in the order in which they are named.

Motor trucks and tractors were imported to the number of 220, as compared with 239 during the same period, the value of this class of imports being 1,327,000 gold marks. The export of German motor trucks and tractors decreased. The chief markets for German motor trucks are Holland, North Russia, Finland and Spain.

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"CONGESTION will not be remedied until every automobile owner accepts it as his own problem—just as much his own problem as his license or a leaking radiator on his car."

But the brilliant success of the Washington conference should not be allowed to dazzle us into neglecting further efforts. After all, the traffic problem is a local one. It will handicap further work if the man in the street and the man in the automobile—as well as the man in the city hall—feels that somehow, by some black magic or White House magic, his traffic problem will solve itself.

Thinking down to the bottom, we realize that congestion will not be remedied until every automobile owner accepts it as his problem—just as much his own problem as his license or a leaking radiator on his car. And before that, every automobile dealer should accept it as his problem. And before that, every automobile manufacturer should accept it as his problem.

If we each of us realize it as our own individual problem, we shall all feel it our duty to work together for its solution.

It does not seem credible that the automobile industry and the automobile owner should have failed to learn the obvious lesson from the burdensome tangle of restrictive legislation which now surrounds them.

As traffic congestion grows, regulation and restriction increase.

As automobile use is handicapped, so inevitably must automobile selling and automobile production be handicapped.

It has been suggested that in each city the automobile distributors should form an active committee on traffic, and its first function should be to bring the question before the local business organizations. These organizations, whether it is the chamber of commerce or the luncheon clubs, should be urged to organize a traffic committee or help vitalize an existing one. Such plans should produce results.

When these are in action the next step is a campaign of public education through meetings and the newspapers, with the main object in view of having the city administrative body formally institute a City Traffic Commission, if none exists. If there is already a City Planning Commission which is inactive—and, unfortunately, sometimes it is—the campaign of education should arouse it.

Just what are the traffic problems? Where will their solutions be found?

Last spring the writer made a survey of these problems by gathering first-hand information from the city engineers of some two hundred and thirty municipalities of various sizes over 10,000 population. Nobody would have expected to find such a prevailing feeling of pessimism among technical officials as was expressed in the data submitted—or such a record of inadequacy in real activity.

There is little doubt, after studying this material, that the traffic problem is the most acute and difficult one with which the cities have at present to contend. Water supply, sewerage, street paving—these are comparatively simple and their technique has been worked out and, if a city is willing to pay, it can solve these problems definitely and continuously. Even "crime waves" can be stemmed, and public health can be bought. But in many cities only the utmost intelligence, effort and expenditures can be of substantial help in the traffic situation. And, in a few years, if they are not available soon, even unlimited planning, action and money will not avail.

Most of the 233 municipal engineers who contributed to this survey reported that the principal thoroughfares in their cities were badly congested. In all but a very few cities the width of the streets was never designed so

that they could bear safely and comfortably even a small proportion of the traffic which uses them. Business streets, as compared with main thoroughfares, are wider than average in only about 25 per cent of the cities and are narrower in about half the other 75 per cent. As a result, parking conditions are well-nigh hopeless.

When the cities were confronted with growing traffic problems a few years ago, the police departments assumed charge. The congestion was slight compared to what it is now and regulatory measures were simple—and seemingly effective. In most cases, while the engineers feel that the traffic problem is really an engineering problem, they find that it is still in the hands of the police department. Traffic rules, one-way streets, signal towers—they worked at the beginning, and apparently the prevailing theory is that as traffic congestion increases, all that is needed is simply more rules, more one-way streets and more signal towers—and bigger traffic courts.

The police officials and their advisors in many of the large cities have used commendable ingenuity and patience in untying traffic tangles and inventing schemes for preventing them. But the end of such measures is near—what is now needed is engineering ability and not police power.

The automobile industry need have little fear that regulation will go "beyond the limit." The big cities probably will never forbid the use of automobiles in congested sections—they will not have to. Already the New York subways are urging automobile owners, through advertising, to park their cars out of the theater and shopping centers and go downtown by train. As a matter of fact, many motorists have been doing that for months.

Problem One of Streets

When the cities and their traffic commissions begin to find that the traffic problem cannot be solved by putting drivers in jail, they will turn their attention to the streets.

As the engineers point out, traffic congestion can be relieved by expanding intersections, "separating" grades, rounding corners, eliminating obstructions. Even better results can be obtained by intelligent and liberal repaving of streets which are not being used because of poor pavement, thus multiplying the traffic lanes.

Beyond that—and a large proportion of the cities are already beyond that—comes widening of streets. About a third of the cities which reported in the survey already have had to widen their streets and about a half realize that they must spend millions in such widening.

Even the widening of existing streets is not the full answer, and on this point we have the frank statement of the city planning engineer of Minneapolis: "Increasing traffic cannot always be adequately provided for by street design in existing cities, and each street system will gradually reach a saturation point." And the city engineer of Seattle says: "I could take a map of Seattle and show you a possible, indeed, immediately probable, traffic in many directions from six to ten times the maximum capacity of all the streets that could possibly serve it."

It is clear from the reports that the traffic tragedy of American cities will be that the smaller cities will repeat the history of the larger ones—unless they learn the lesson from the experience of the others.

How many cities will go through the whole story of traffic rules, mechanical regulation, minor street improvements and costly street widening?

How many will go through all these stages, remedies lagging a few years behind the troubles at every stage?

Is it necessary—must the cities and the automobile industry suffer these growing pains?

It is difficult to read the record and believe otherwise, but for those who have faith and express it in works, it is possible to avoid the worst of these problems. However it may be with the larger cities, the smaller ones still have it in their power to detour much of the trouble.

But as long as they think of the traffic problem in terms of automobiles only there will be no hope. The traffic problem is the city planning problem. It is perhaps even more important in laying out the streets of a city to foresee the traffic which is going to use them than it is to foresee the structures which are going to be built along them.

And it is possible to foresee—even to determine by regulation—what parts of the city shall be used for various purposes—and therefore to foresee and determine the type of traffic which will and should use the various thoroughfares connecting those sections.

Only a handful of city engineers report that traffic studies are being made by experts with a view to city planning. In only 25 per cent have any traffic counts been made at all from the broader aspect. And yet nearly half the cities reporting have "city planning commissions."

Here, then, is the most serious danger of all, should the program of action be successful to the point of organizing traffic planning commissions.

The traffic commissions should not be allowed to pass into a state of blissful futility as have a majority of the city planning commissions.

Traffic plans and designs should not be allowed to gather dust in the archives of city halls.

They should be put into practice, and the only way that can be accomplished is to "sell" them to the people and to the public officials by every possible means of education and publicity—sell them vigorously and continuously until the plans are realized and all preventive measures in operation.

German Imports and Exports

IN spite of the embargo no fewer than 2070 automobiles were imported into Germany during the period January-May of last year, as compared with 283 during the same period of the year before. The largest number of cars (752) came from Alsace-Lorraine, whence cars are admitted free of duty. From Austria 676 cars were imported, from Italy 154, from France 26 and from other countries 462.

The German exports during the same period consisted of 705 cars, as compared with 2275 during the same period the previous year. Thus the exports of passenger cars were less than one-third as great as formerly, while the imports were more than seven times as great. The value of the exported cars was 4,651,000 gold marks, while that of the imported cars was 15,904,000 gold marks. Among the chief markets for German passenger cars are Holland, Switzerland, Austria, Hungary and Sweden, these countries ranging in the order in which they are named.

Motor trucks and tractors were imported to the number of 220, as compared with 239 during the same period, the value of this class of imports being 1,327,000 gold marks. The export of German motor trucks and tractors decreased. The chief markets for German motor trucks are Holland, North Russia, Finland and Spain.

Future of Automotive Industries and Highways Are Inter-Dependent

Engineers expect initial system of hard surfaced roads to be completed in ten years. Traffic surveys effect material savings.

By H. Lionel Williams

THAT the measure of the highway developments of a country is a measure of its cultural advancement; that transport is the life-blood of the nation, whose flow is dependent on the state of its highway arteries; and that as good roads extend, so will grow the use of automobiles and trucks, was the theme of the papers presented at the recent Chicago Convention of the American Road Builders Association.

Concurrent with the convention was an exhibition of road building equipment—a show that revealed a multitude of possibilities for the automotive engineer. Apart from the truck exhibits, practically all of the machinery shown employed the gasoline engine as prime mover. Unfortunately, many of them were adaptations and apparently of a more or less experimental nature, suggesting opportunities for the automotive designer. To the casual visitor, such a show demonstrates how large a part the automobile is playing in the development of good highways.

Before laying down a single highway, it is of fundamental importance to know what we are building roads for, pointed out one of the convention speakers. The traffic survey provides this information and helps to determine the future needs of the areas through which the roads are built. Future changes in population and in industries have to be forecast and allowed for. Where this planning is not carried out economic waste results.

The first duty of the highway engineers is to make possible the general flow of traffic throughout the country. To complete one section or district to the exclusion of another would not be fair nor just. This plan is now being followed, with a view to completion of the initial system of roads in about ten years. After that the local schemes will be dealt with and these are expected to occupy a further fifteen years. Thus it will be twenty-five years before we have an intensified system of hard-surfaced roads which will permit the fullest utilization of motor vehicle transportation.

Recent Pennsylvania Surveys

Recent surveys in the State of Pennsylvania have shown that (a) really heavy traffic only occurs within 10 miles of large centers of population, (b) that 92 per cent of the traffic is local and only 8 per cent interstate, (c) that 30 to 40 per cent of the passenger car traffic is engaged on business, (d) that trucks average only 10 per cent of the traffic.

Of the truck traffic, it is instructive to learn that only 9 per cent of the vehicles are of a gross weight of 18,000 lb., while those of 24,000 lb. or over comprise but 1 per cent.

How big a difference there can be between two apparently similar highways crossing the same State, is shown by the following comparison:

In Pennsylvania the Lincoln Highway is 360 miles long, and the population within 10 miles of it numbers 4,500,000. The adjacent Roosevelt Highway, on the other hand, is 443 miles long, but the bordering population is only 650,000.

Conditions also vary considerably along the same highway. That is why it would not be economically sound to lay down roads of a uniform type and size. The Lincoln Highway, for instance, near Philadelphia, with its 2,000,000 population, has to carry an average traffic of 6852 vehicles per day, of which 778 are trucks. Near York, which is 90 miles from Philadelphia, and has a population of 47,500, the same highway is called upon to handle but 3042 vehicles a day, of which 466 are trucks.

Actual Savings

As a result of studies in Pennsylvania the road user is being saved, on an average, $44,300 a year, by reason of shortened routes and reduced layout where light traffic prevails.

Making roads efficient is also an aspect to receive close consideration. The capacity of a road is often four times what it is normally called upon to carry, but it cannot be fully utilized because of the artificial restrictions placed upon it, such as curves and cross-roads. One cross-road will often reduce the actual road capacity by 50 per cent. When cross-roads and other obstructions to the free flow of traffic are abolished, the efficiency of the roads will go up, and the cost down.

At the present time the average cost to the road users for every 1000 ft. of hard-surfaced highway is 2.3 cents per vehicle.

As a means of raising funds for road maintenance, the gasoline tax is rapidly gaining favor, simply because the motoring public is coming to realize that good roads are investments bringing returns in hard cash. The difference in cost of fuel and maintenance generally, between operating over a dirt road and over a hard-surfaced highway, may be anything from 1 to 4 cents a mile. That is why automobile owners and truck operators in 38 States have decided they are getting a substantial dividend on the 1 to 4 cents a gallon they are paying in taxation. What this means to the State treasuries will be appreciated when it is stated that in 1924 the average consumption of gasoline throughout the country was 450 gal. per vehicle.

Finally, when the highway program is completed, 25 years hence, and every solitary outpost is brought in contact with civilization, then will be the time to consider questions of "saturation." With the spread of highways, grows the use of the motor vehicles, a reciprocal action that makes the one idea inseparable from the other—roads and transport, transport and roads, the forerunners of civilization. As the speaker at the Highwaymen's banquet said, "Roads carry civilization with them wherever they go. Put a road by a rude mountain shack, and curtains appear in the windows, indications of higher mental outlook, the beginning of civilization."

Just Among Ourselves

When Is an Accessory a Part?

THE first and twenty-fifth automobile shows probably differed in no respect more than in the accessories included on the cars as standard equipment. At the first exhibit not even windshields were standard equipment. The extent to which some accessories are included as standard equipment can scarcely be realized until specific figures are presented. Investigation at the New York show proves that 43 per cent of all the models shown were equipped with automatic windshield wipers and 14 per cent with hand wipers. Moto-meters appeared as standard on 49 per cent of all models; stop lights on 45 per cent; clocks on 37 per cent; spare tires on 24 per cent; cowl lights on 47 per cent, and mirrors on 58 per cent. All of which goes to show that the "accessory" of yesterday is the "part" of tomorrow.

How Times Have Changed! Take Exports for Example—

WE'RE not going to tell any tales out of school, but the great success which attended the holding of an export trade conference at the New York Show has recalled vividly to mind a conversation we had about three years ago with a very prominent automotive executive. We asked him about foreign trade prospects. "Oh, they're all right, I guess," was the reply. "Nothing to bother much about, though. Exports are such a small part of our total production that I can't see anybody getting much excited about them for a good while to come." How times have changed! This particular executive has become an enthusiastic foreign trade booster and his company is doing a real business in foreign fields. And over four hundred other automotive men were interested enough in 1925 foreign trade prospects to sit for several hours in a poorly ventilated room to hear about overseas markets for automotive products. Export trade definitely has passed the baby brother stage—it's a full-fledged Boy Scout now.

Parts Prices on the Table Again

SPEAKING to his dealers the other day, a passenger car company president said that an upward tendency is appearing in parts prices. He objects to the increases because he doesn't see any justification for higher parts prices just now. The justification from the parts makers' standpoint probably would be that higher prices are necessary if he is to make even fair profits. The car maker, on the other hand, may say quite properly that price competition is so keen at present that he has to think about cutting car prices, rather than raising them; consequently, he isn't going to be enthusiastic about paying more for parts. Both parts and car makers are seeking the same end—profits. In the long run conditions will have to be adjusted so that both may achieve that end.

Mr. Babson Didn't Guess High Enough

HAVING started off a few weeks ago by checking up one of our own guesses about automotive progress, it's a pleasure to turn to the task of checking up somebody else. A report issued by Roger Babson Aug. 9, 1921, makes mighty interesting reading right now. Mr. Babson on that date said: "The most important question in the automotive industry is, 'What is the saturation point with our population of 105,000,000 people?' The optimistic say 20,000,000; the conservatives say 10,000,000. Our estimate is 12,000,000, until coal dust or some other form of cheap fuel can be used." Total registration already has left Mr. Babson's "saturation point" behind by more than 5,000,000, and the industry still is going strong. Tough is the way of the prophet!

1925 Is Presidential Year for Henry Horning

CALVIN COOLIDGE might have been the most prominent man presidentially speaking in 1924, but Henry L. Horning bids fair to grab off presidential honors for 1925. Starting out the New Year by becoming president of the Waukesha Engine Co. and following up immediately by taking up the reins as president of the Society of Automotive Engineers is a good month's work for any man. Along with the rest of the industry we offer congratulations.

Starting the New Year Right

SAY, have you heard the big news? "Just Among Ourselves" has a constant reader. Yeh, honest. A. M. W. writes that "When J. A. O. was first started it was such a new departure that some of the old readers of A. I. were a bit surprised and wondered whether it fitted or not. With the ice broken, each issue appealed more strongly," he continues, "and today I would feel lost if I didn't find this page." That certainly puts it up to us, all right. If we have many readers who feel like that, we'll have to step on the gas this year to live up to expectations.—N. G. S.

Sand Blasting Cuts Cost of Cleaning Many Kinds of Automotive Parts

Apparatus designed to handle wide variety of shapes and sizes. Suction, gravity and pressure systems used. Some parts may be cleaned collectively, some individually. Operator is protected.

By P. M. Heldt

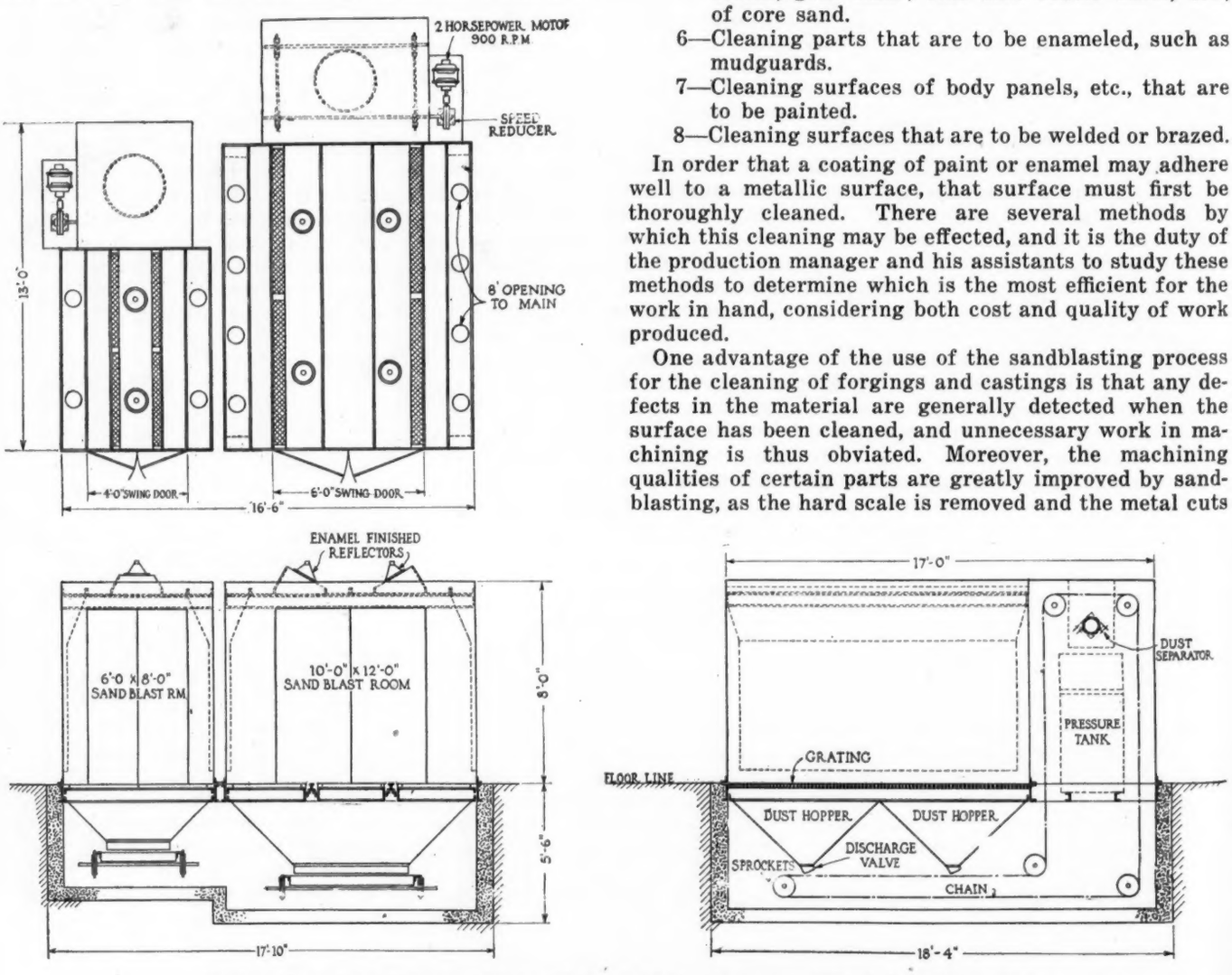
UP to about ten years ago use of the sandblasting process was largely confined to foundries, where iron, steel, brass and aluminum castings were cleaned by its means. During the war a rapid development of the process took place, and since the armistice its application in industry generally, and particularly in the automotive industry, has made rapid strides.

Sandblasting lends itself to surface cleaning of all kinds of metallic objects, and it is probably of the greatest advantage in the case of parts covered with metallic scale and those of rather complicated form, which, consequently, are difficult to clean by hand. In the automotive industry the following operations are constantly being performed by means of this process:

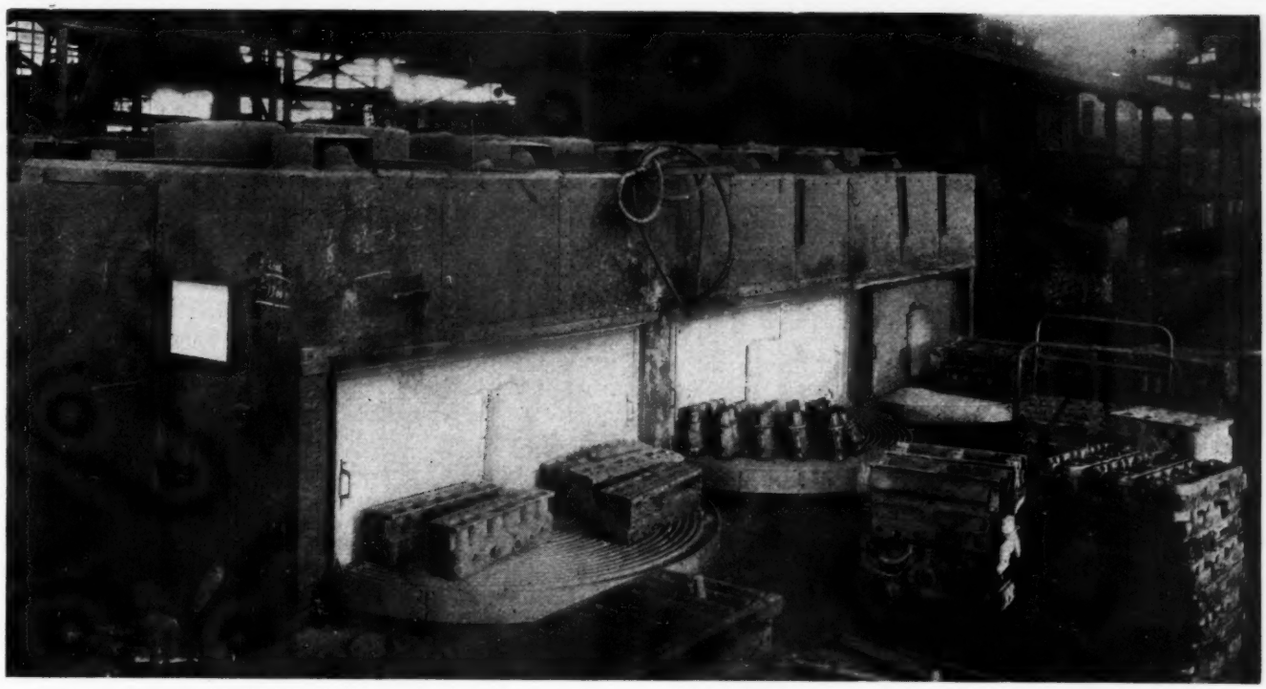
1—Cleaning drop forgings of scale.
2—Cleaning case hardened parts, such as transmission gears, of scale.
3—Cleaning the brazed joints of such parts as motorcycle frames.
4—Producing a clean, uniform metallic surface on such parts as carbureter bodies which are not to be finished in any other way.
5—Cleaning the inside of such castings as cylinder blocks, gear cases, rear axle center cases, etc., of core sand.
6—Cleaning parts that are to be enameled, such as mudguards.
7—Cleaning surfaces of body panels, etc., that are to be painted.
8—Cleaning surfaces that are to be welded or brazed.

In order that a coating of paint or enamel may adhere well to a metallic surface, that surface must first be thoroughly cleaned. There are several methods by which this cleaning may be effected, and it is the duty of the production manager and his assistants to study these methods to determine which is the most efficient for the work in hand, considering both cost and quality of work produced.

One advantage of the use of the sandblasting process for the cleaning of forgings and castings is that any defects in the material are generally detected when the surface has been cleaned, and unnecessary work in machining is thus obviated. Moreover, the machining qualities of certain parts are greatly improved by sandblasting, as the hard scale is removed and the metal cuts



Design for a 6 by 8 ft. and 10 by 12 ft. sand blasting room (Northern Blower Co.)



Rotary table sand blast cabinets for cleaning cylinder blocks (W. W. Sly Mfg. Co.)

considerably easier. Thus in one case it was found that if the chrome steel rings of annular ball bearings were sandblasted before grinding, the capacity of the grinding machine was increased by about 50 per cent, and the life of the grinding wheels in the same proportion.

An advantage claimed for sandblasting in connection with sheet metal that is to be painted or enameled, is that the surface is slightly roughened by the process, whereby a greater degree of adherence is assured.

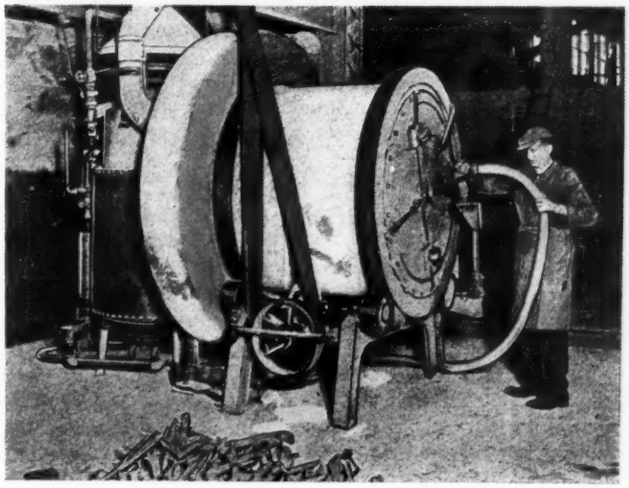
In connection with cylinder castings and the different casings used on motor cars, it is of the greatest importance that they be thoroughly cleaned of all core sand before being machined and assembled, for if this were neglected the sand would be likely to shake loose in service and get into the bearings, resulting in cutting of same, which would necessitate expensive repairs.

Great Variety of Sizes and Parts to Be Cleaned

As parts of a great range in size and a great variety of shapes have to be cleaned, it is only natural that a number of entirely different types of sandblasting apparatus should have been evolved. The object in every case is to thoroughly clean the parts involved with the least amount of handling (least labor cost) and the smallest expenditure of mechanical energy in the compression of the air required for the blast and in the handling of the sand and of the parts worked upon.

The general principle of the sandblast is that a certain amount of sand or steel abrasive is fed to a jet of compressed air which issues from a suitable nozzle at great speed, up to 700 ft. per second. The abrasive is carried along by the air and is thrown at great speed onto the surfaces which it is desired to clean, the cleaning effect being due to the pressure of impact and the rubbing action of the sharp-edged grains.

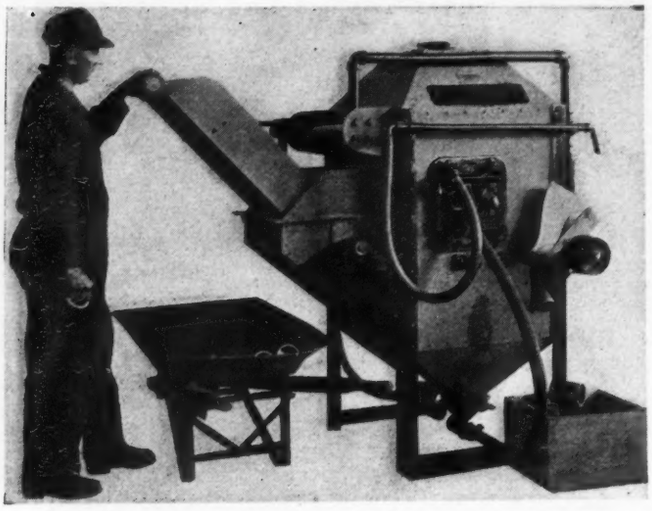
It may be well here to say a few words as to the most desirable pressures to use for different kinds of work. Of the foundry products, steel castings are the hardest to clean, and if every particle of sand fused to the casting is to be removed from such castings so as to make the



Large sand blasting barrel (New Haven Sand Blast Co.)

machining easy, as high a pressure as 90 lb. per sq. in. should be used. Non-ferrous metals can be cleaned effectively and efficiently with an air pressure not exceeding 40 lb.

According to one manufacturer, air pressures and nozzle sizes usually are compensating factors; that is, with pressures of 70 lb. and up, sufficiently smaller nozzles will be used, as compared with those in use with air pressures of 60 lb. or less, that the horsepower of the jet is substantially the same in both cases. Of course, with a nozzle of given size, with a higher pressure the time for cleaning any particular part will be cut down and thus the labor charge reduced, but, on the other hand, the amount of energy used will be increased. Thus with one item of cost increasing with, and another in opposition to the pressure, for any particular job there is a certain air pressure which results in the most economical operation. If the apparatus can be operated at the pressure of the air system installed in the plant, it is quite an advantage, as reduction of the pressure for the blast involves a serious loss.



Automatic piston cleaning machine (Pangborn Corp.)

There are three general systems of sandblasting apparatus. In the suction system the abrasive is carried to the nozzle by suction created by a jet of compressed air passing through it. The air jet carries the abrasive along and discharges it against the surface to be cleaned. The principle involved is that of the steam injector.

In the gravity system the abrasive is carried to a point just above the nozzle by means of an elevator and is mixed with the air by gravity. This system is slightly more complicated than the suction system, but it is somewhat more effective and possesses fewer parts subjected to rapid wear.

Where the most powerful cleaning action is required the direct pressure type of apparatus is usually employed. In this the air and abrasive are kept under the required pressure in a suitable container and discharged through the nozzle. In this way the abrasive can be given the highest possible velocity, which results in the most effective abrasive action. The ordinary hose sandblast is generally of this type.

Four Types of Equipment

There are four general types of sandblasting apparatus. Small parts of such form that they can stand handling in a sand blast barrel at low speed, are cleaned in bulk in such a barrel, in order to reduce the labor cost. The barrels are of steel construction and revolve around either a horizontal or an inclined axis. There is a door in the cylindrical wall, the size of which limits the size of the articles which can be handled in the barrel. The nozzles are fixed on the axis of the barrel and point into it, the pipe being carried in through one of the trunnions on which the barrel revolves.

Barrel sandblasting bears some relation to tumbling as practised in the foundry, and the most delicate parts cannot be handled by this process. There is this difference, however, that in the tumbling mill cleaning of the parts is accomplished by the friction of the parts against each other or against cleaning agents, such as stars, etc., and the results are almost directly dependent upon the speed of the mill, whereas a sandblast barrel can be turned very slowly, as the only object of the revolving motion is to turn the objects around so that all surfaces may be exposed to the action of the stream of abrasive. Thus pieces that cannot be cleaned by tumbling can often be cleaned in the sandblast barrel without detriment.

Sandblast barrels are made in a considerable range of sizes, from about 20 in. diameter by 16 in. length, to barrels with a capacity of two or three tons. The barrel is distinctly a production type of apparatus and for this reason is much used in the automotive industry (probably more than any other type). These tumbling barrels may be driven by friction, by double eccentrics or by positive gearing. The abrasive and dust drop through perforations in the cylindrical wall of the barrel and may be raised by means of an elevator to the top of the machine where the dust and coarse particles are separated out by means of screens, and the good abrasive is delivered into a hopper to be used over again. Sometimes the heads of the barrels are given a special shape which tends to cause the parts within to move around, exposing all sides to the blast, as the barrel is revolved. Dust is generally removed from the abrasive by means of an exhaust system. This dust is either detached from the surfaces of the parts being cleaned or results from the breaking up of the grains of sand. These sandblast barrels are very handy and are particularly useful where a large variety of work has to be done.

Sandblast Tank and Hose

The simplest form of sandblast apparatus and the one which came into use first is the sandblast tank with hose. Sometimes a long hose (up to 50 ft.) is provided, giving a long reach, and the facility with which the nozzle can be turned in any direction makes the outfit adaptable to a great variety of uses. This hose machine usually consists of a vertical, cylindrical tank of sheet steel and is filled with the abrasive through an opening in the top. Cast integral with or secured to the lower head of the tank is a member through which the abrasive flows from the tank; compressed air is also introduced through this member and air and abrasive together are discharged through the hose which is connected to it. Air is also admitted through the top of the tank, so that the pressure is equalized, and the abrasive can flow freely from the tank to the mixing chamber by gravity. Valves control both the air pressure and the flow of abrasive.

For parts which are too large or too delicate for the tumbling barrel, but in connection with which the advantages of automatic handling are desired, use is made of a revolving table type of sandblast. This table, which is made of grated form, is mounted on a vertical axis and revolves on dust-proof bearings. It carries the parts to be cleaned past a series of fixed nozzles pointed in different directions. Substantially half of the table is outside the cabinet, this half being used for unloading and loading while the parts inside are being acted on by the sandblast. The top of the table is generally made of renewable bars and the drive is mostly by friction. A rubber curtain is hung across the opening in the wall of the cabinet over the table, the depth of which must be such that the largest parts which it is planned to sandblast will pass through it.

The fourth type of sandblasting apparatus is the cabinet in which parts are handled individually by the operators. This is a small closed chamber, made either of wood or metal, with a single stationary nozzle. The parts to be cleaned are introduced through a hole in the side which is closed by a curtain during the period of operation of the nozzle. The operator stands in front of the cabinet, with his arms extending through openings with rubber sleeves to make a dust-proof closure, and holds the part being cleaned in his hands, turning it around while the stream of sand is being played upon it. He can observe the effect of the blast through glass-covered openings protected by wire screen. Electric lights illuminate the work within the cabinet. Sometimes these sandblasting cabinets are provided with movable nozzles at the end of a hose.

For sandblasting very large pieces of work, such as an assembled chassis, for instance, regular sandblasting rooms are fitted up, into which the parts can be moved on trucks. Sometimes the objects are placed on a turntable and slowly revolved, so that every part is brought close to the operator, who stands just outside the room.

Four-cylinder blocks are thus cleaned at the rate of one every thirty-six seconds and six-cylinder blocks at the rate of one every sixty seconds, making the sustained hourly production equal to one hundred and to sixty per room and per operator in the two cases respectively. The writer is informed that in one foundry, where operators were on piece-work basis, the cost of cleaning a casting comprising six cylinders and the top half of the crankcase was reduced to 5 cents, this including moving the castings to and from the sandblast room.

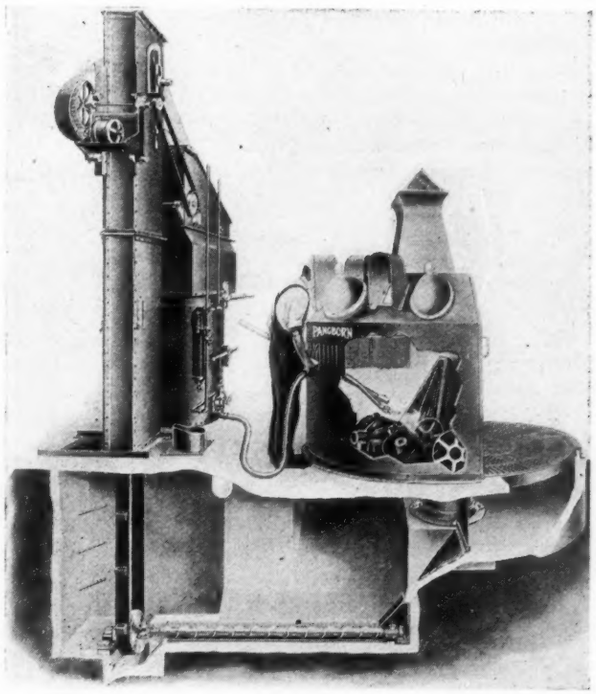
Handling of Automotive Parts

In some plants cylinder blocks, as well as other parts, are cleaned in cylindrical cabinets with rotary table, the cabinet having an opening through which the operator directs the hose and nozzle from the outside, so he is removed from all contact with the dust-laden air.

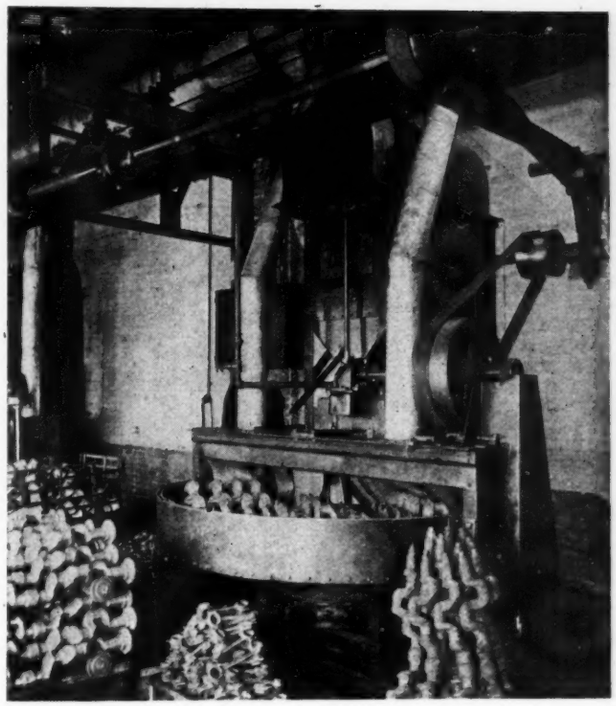
It is said to have been found that bumpers can be most economically cleaned in the table room. The table is equipped with brackets for holding the bumpers, which are loaded, turned, and unloaded on the portion of the table exposed outside the room, and production by this method reaches 75 to upwards of 200 complete bumpers per hour, according to type and size.

Body springs are likewise cleaned in the table room, and for this work a specially constructed table with three divisions has been evolved.

Pistons are now cleaned by large producers by an automatic machine into which the pistons are fed either by hand or conveyor. These machines are automatically timed so that each piston is thoroughly cleaned (inside), being revolved in position for application of the sandblast stream from stationary adjustable nozzles, and moving forward to make place for the next piece. The machine automatically ejects the cleaned pistons and delivers them to totes, other receptacles or a conveyor.



Hygienic table cabinet for heavier parts, broken away to show details of construction (Pangborn Corp.)



Method of handling automotive forgings on the automatic rotary table sand blast (Pangborn Corp.)

Rim-cleaning machines are also hygienic and automatic in their operation. Revolving arms on which the rims of various sizes are placed are mounted on a pedestal, which is rotated to bring the loaded arm within a closed housing. Swinging nozzles within the housing travel the entire length of the rotative arm, automatically blasting the rims while they are revolving. The other end of the arm is exposed for loading and unloading the rims and thus removes the operators from contact with the dust created and provides for continuous blasting action.

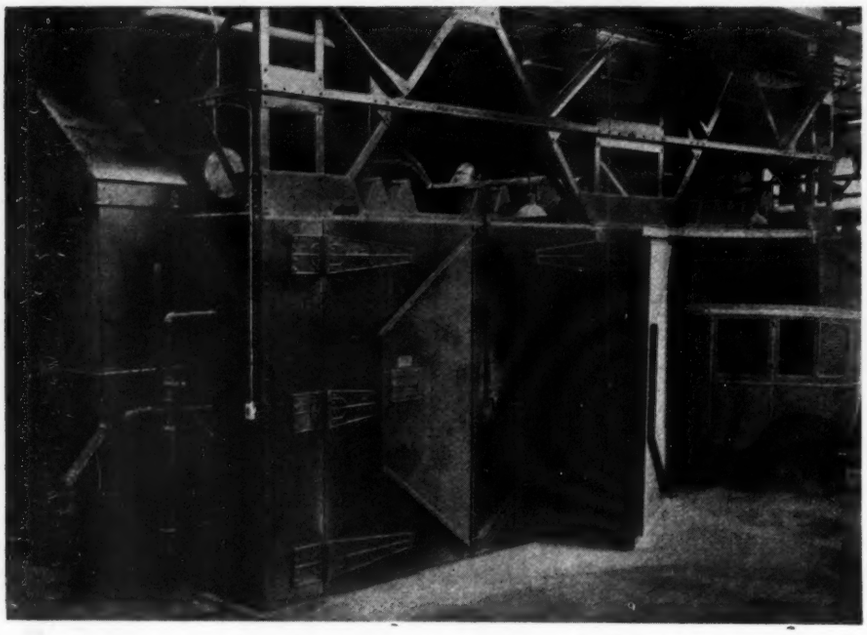
Cleaning Bodies for Painting

Bodies, both open and closed types, are sandblasted before painting, this work being done in "rooms." One company uses sixteen such rooms, handling the bodies on turntable trucks.

Open bodies are cleaned in from two to two and one-half minutes, according to sizes. In this plant operators are on a piece-work basis and handle the trucks into and from the "rooms."

From the sandblast room the bodies are passed to a blow-off room, where compressed air jets remove all adhering dust or sand, and the bodies are then routed to the painting department.

The wide application of sandblasting equipment in the automotive industry in recent years has been ascribed to three causes. The first is the demand for clean castings (which increase the quality of the work done in the machine shop and also the rate of production), together with the more extensive use of heat treatment in order to increase the strength of parts. The second cause is the design of practical hygienic equipment that removes the operator from contact with the dust produced and gives better control of the dust, while the third is the improvement in ventilation systems for sandblast rooms, which, in connection with the use of



A battery of modern body cleaning sand blast installations, including cleaning and blow-off rooms, with over-mounted ventilating equipment (Pangborn Corp.)

dustless steel abrasive, has made possible clear vision within the sandblast room and the elimination of the occupational hazard which formerly was a deterrent to the installation of equipment of this kind.

Instead of sand, metallic abrasives are now frequently used for cleaning by the blast process. These abrasives come in both angular and spherical form, the former having sharp cutting edges. One of the chief advantages claimed for metallic abrasives is that they do not disintegrate nearly as fast as sand, producing far less dust, and that in consequence the working conditions are more hygienic and the operator can see the objects he is working on more clearly, so he can do more and better work.

The same as in grinding operations, considerable importance attaches to the selection of the proper grain of the abrasive. In the cleaning of large, heavy castings, where finish is not a factor of any consequence, an abrasive of large grain is preferable, as—being heavier—it imparts a more powerful blow to the surface and therefore effects more rapid cleaning. In other work, where finish is of prime importance, as in the cleaning of bodies, gears, etc., a finer grained abrasive must be used, and in substituting steel abrasive for sand a grain of the same weight rather than the same size must be used in order to obtain substantially the same effect. This involves the use of steel abrasive of a much finer grain, and it has been found that where steel abrasive has been substituted for sand and complaints have been made as to the finish, the trouble is generally due to the use of too coarse a grain.

Advantages of Metallic Abrasives

Owing to the fact that metallic abrasives retain their efficiency over twenty times as long as sand, the freight and cartage expenses are much less. As they do not disintegrate as quickly as sand, less energetic ventilation will suffice, and power can be saved on this account. It is also pointed out that metallic abrasives have approximately two and a half times the specific gravity of sand. It is not quite clear, however, in just what way this works to the advantage of the user, except that it reduces the storage space required. Metallic abrasives for this purpose are manufactured by the Pittsburgh Crushed Steel Co., Pittsburgh, Pa.; Steel Shot & Grit Co., Amesbury, Mass.; Harrison Supply Co., Inc., Boston, Mass., and the Globe Iron Crush & Shot Co., Mansfield, Ohio.

In the preparation of the above article close use was made of information furnished by the following firms: American Foundry Equipment Co., New York; L. O. Koven & Brother, Inc., Jersey City, N. J.; New Haven Sandblast Co., New Haven, Conn.; Northern Blower Co., Cleveland, Ohio; Pangborn Corp., Hagerstown, Md., and W. W. Sly Mfg. Co., Cleveland, Ohio.

For the photographs and drawings with which this article is illustrated the writer is also indebted to some of the above named firms.

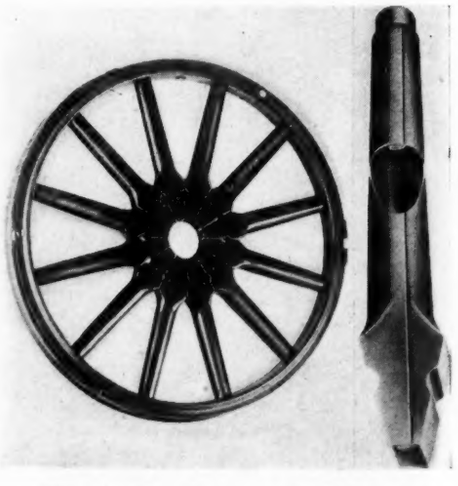
Weldless Pressed Steel Spoke Wheel

A PRESSED steel spoked wheel made without welding or brazing from sheet stock is to be manufactured by the Dayton Wire Wheel Co. of Dayton, Ohio. As shown in accompanying cuts, this wheel is substantially identical in appearance with the wooden spoke wheel. The spokes themselves are mitered at the hub end so that, when placed in correct relative position, they form a wheel center arch which is practically the same as that of wood wheels.

Spokes are tapered toward the outer ends while the ends themselves are reduced in diameter where they pass through the felloe. From the cutaway section of the individual spoke section shown, it will be noted that a double-folded lock seam is used at the joint, this seam being formed with dies and without welding or brazing, which might bring about failure resulting from a crystalline structure.

Advantages claimed for this wheel, which is said to have undergone successfully months of severe testing in which all kinds of road conditions were encountered, include freedom from shrinkage and warping due to atmospheric changes, freedom from rattle and rumble and ability to take a high baked enamel finish of exceptional durability.

This wheel is to be manufactured in sizes suitable for both standard and balloon tires, but its production will not interfere with the production of Dayton wire wheels, which are continued as heretofore by the Dayton company.



Wheel with sheet metal spokes to be marketed by Dayton Wire Wheel Co. Cutaway section of spoke shows locked seam

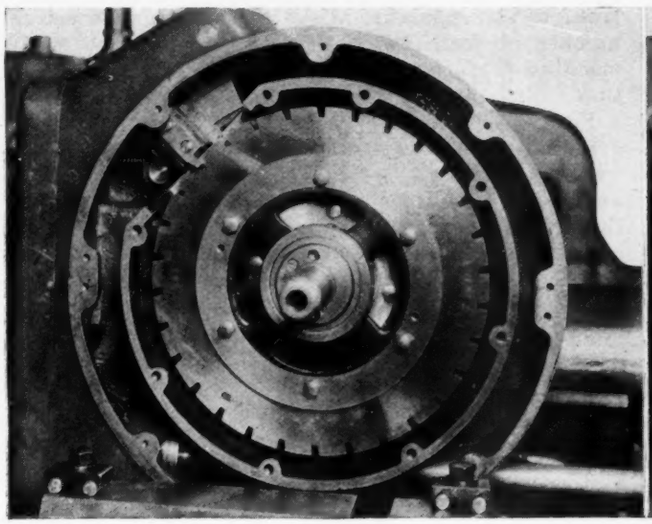


Fig. 1—Hardened and ground index plate of the Walcott gear tooth grinder

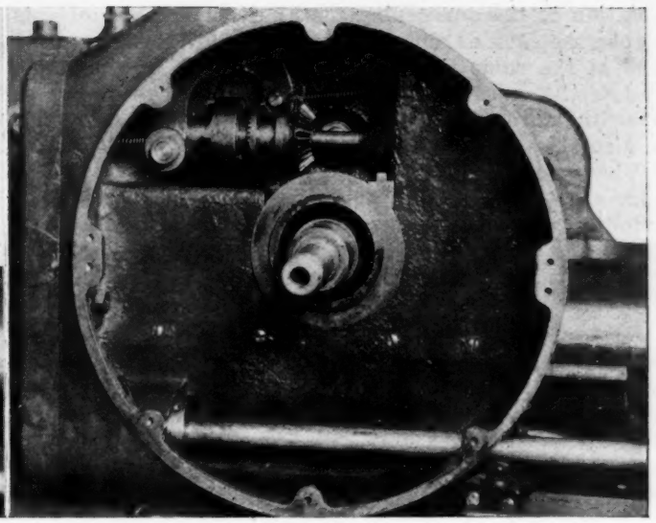


Fig. 2—Indexing housing removed to show constant speed shaft and cam rod lever control

Improved Indexing Mechanism Added to Gear Tooth Grinder

Walcott Lathe Company takes over the manufacture of machine formerly made by the American Grinder Co. Indexing mechanism and splash guard among improvements.

By W. L. Carver

THE Walcott Lathe Company of Jackson, Mich., has taken over from the American Grinder Company the manufacture and sale of the gear grinder built by the latter concern, which henceforth will be known as the Walcott gear tooth grinder. Fundamentally this machine will be continued as described in AUTOMOTIVE INDUSTRIES of May 3, 1923, but an important change has been made in the indexing mechanism and several other details have been refined.

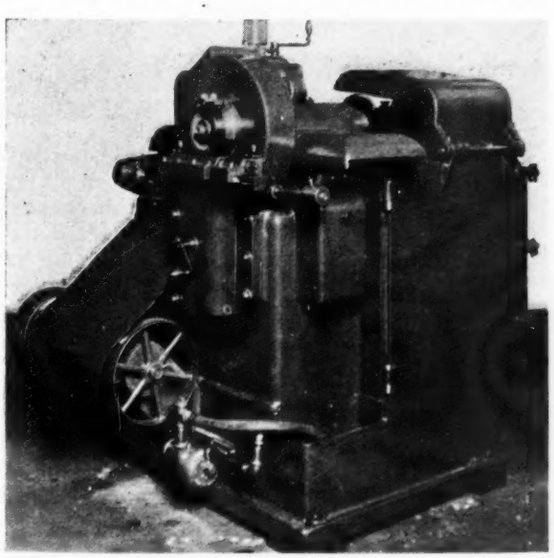


Fig. 3—Rear view of grinder showing steel straps at outer end of spindle and new arrangement of splash guards

As pointed out in the previous article, the involute action at the face of the gear tooth to be ground is obtained by means of two thin steel tapes which are wrapped over a cylinder at the outer end of the work spindle. These tapes are anchored at an adjustable table and therefore perform no work other than that of rocking the spindle. The spindle head is oscillated by a drum cam through an intermediate linkage which allows adjustment for gears of varying size and pitch. In the new construction the indexing mechanism is rather simple but its operation is unusually rapid. As illustrated by Fig. 1, the indexing plate is bolted securely to a spider which is fixed on the work spindle. In turn, the index plate is inclosed in a housing which carries the indexing pawl. This housing swings freely with the index plate and spindle, except for the actual period of indexing.

The work of indexing is performed by a cross shaft which is located above the spindle center and (referring to Fig. 1) back of the indexing pawl, as shown in Fig. 2, in which the housing assembly has been withdrawn. This shaft rotates in phase with the drum cam, so that the point on the face cam as shown, contacts with the shoe on the actuating lever once during each revolution, just before the end of the back stroke. The back stroke follows the grinding stroke, and during this portion of the cycle the gear is cleared of the grinding wheel for

rotation to the succeeding tooth. Near the end of this stroke the cam, as shown, engages to withdraw the pawl and at the same time engages the clutch at the inner end of the cross shaft. This clutch picks up the bevel gear and through its mate drives another pinion, which is also shown.

The second of the bevel gear combination drives a spur gear which meshes with a mating gear on the work spindle. This action is momentary and serves to advance the index plate by one notch. As the indexing housing turns counter clockwise, while the index plate and spindle are turned clockwise by the constant speed cross shaft, the time required for indexing is reduced at least 50 per cent and the production rate has been increased materially. Control of the entire indexing mechanism is obtained by means of a graduated drum at the front of the machine. Usually this drum is set for a number of teeth twice that on the gear, so that the machine performs a rough and finish grinding operation and then stops for reloading.

Formerly the splash guard which surrounds the 30-in. grinding wheel was mounted on the wheel spindle head, which can be adjusted to grind up to 25 deg. pressure angles on both sides of the tooth. In the new design the splash guards are mounted on the base of the machine and their weight is removed from the spindle head. The new arrangement, as shown by Fig. 3, also incorporates a hinged cover which is lowered while the coolant is flowing, and a door which facilitates changing wheels. The machine is designed to handle gears of any diametral pitch from 12 to 3, of any pitch diameter from 1½ to 8 in. and of a face width up to 1½ in.

New Air Cleaner Works on Principle of a Cream Separator

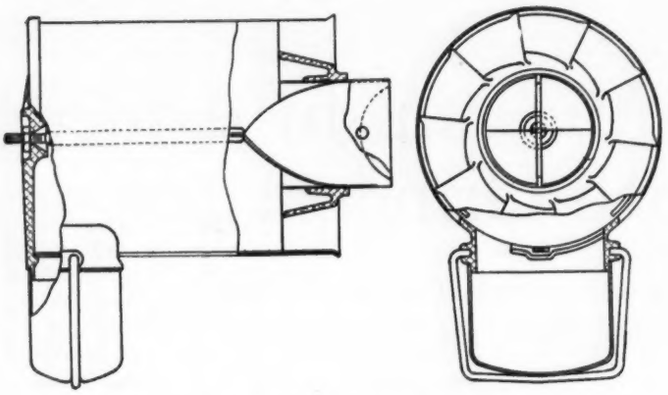


Fig. 1—Sectioned view of AC air cleaner

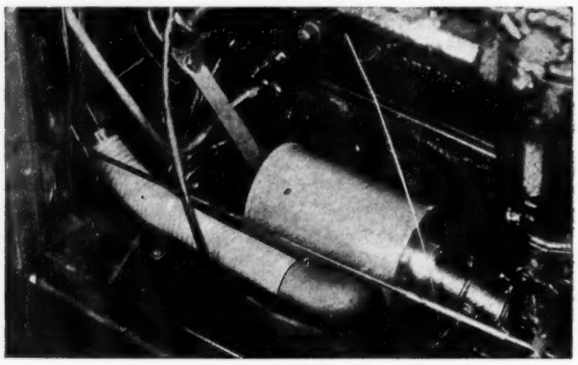


Fig. 3—Installation on engine with air stove

THE AC Spark Plug Co., Flint, Mich., has brought out a new air cleaner which it has developed in collaboration with the General Motors Research Corp. The principle of operation is similar to that of the cream separator in that the dirt is thrown out of the air by centrifugal action. Among the advantages claimed for the new device are a high degree of cleaning efficiency, simplicity, no moving parts and ease of installation. In addition, it may be adapted for use with a hot air stove so that all air may be preheated before passing through the cleaner on its way to the carbureter.

The construction of the cleaner is illustrated in Fig. 1 and its operation in Fig. 2. Referring to the latter illustration, air enters the cleaner at 1 and, in going through the helical passages formed by the directing vanes, is given a rapid whirling motion which throws the dust particles out against the walls of the cleaner. As indicated by the arrows, the dust is carried to the end wall of the cleaner by the helical air currents and then passes through outlet 4 into the removable collector 5.

The outlet of the cleaner connects directly to carbureter intake. Clean air is drawn from the center portion of the cleaner, as indicated by the white arrows. As it passes through the outlet tube, the rotary currents in the cleaner are rectified by the directing plate 6 so that a straight current of air enters the carbureter.

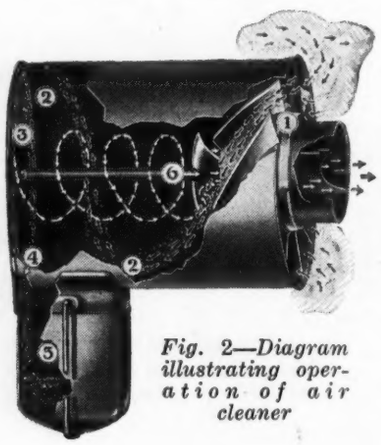


Fig. 2—Diagram illustrating operation of air cleaner

When the cleaner is installed in conjunction with a hot air stove, the side walls are extended and an end plate fitted to provide an entrance chamber ahead of the directing vanes. The air enters this chamber through a side inlet. A typical installation of this kind is shown in Fig. 3.

The new cleaner will be sold for factory equipment and also through jobber-dealer channels.

AUTOMOBILE engineers will be interested to learn that the high speed engine indicator which hitherto has been known as the R. A. E. indicator, because it was developed by officers of the Royal Aircraft Establishment, has now been placed in production by Dobbie McInnes & Clyde, Ltd., 57 Bothwell Street, Glasgow, Scotland. It is to be known hereafter as the Farnboro electric indicator. A description of the principle of this instrument appeared in AUTOMOTIVE INDUSTRIES of Sept. 6, 1923. The method made use of in this indicator is that of recording the time at which the cylinder pressure balances a standard air pressure. There will in general be two such balance points per cycle, one while the pressure is rising and the other while it is falling. By gradually increasing the air pressure a set of time records is obtained covering the whole range of cylinder pressures, although each pair of records belongs to a different cycle. The time interval between the two balance points of the cycle will decrease toward the peak of the diagram.

New Commercial Chassis Adapted for Either Truck or Bus Body

Fisher Fast Freight is powered with Continental engine, three speed selective transmission and spiral bevel gear type of rear axle, geared to give from 35-40 M.P.H. maximum speed.

LOW center of gravity and frame height, full pneumatic tire equipment, ample engine power and a broad range of speed combine to make the new Fisher Fast Freight suitable for high speed road haulage, parcel delivery or the bus field. This chassis, which is the latest development of the Standard Truck Co., is priced at $1,295 and has a wheel base of 146 in. Tread at both front and rear axles is 60 in. Maneuvering is facilitated, for in spite of the unusually long wheel base, the additional width of tread allows a small turning radius. The load capacity is 3000 lb. in addition to the weight of the body, the rating being 1½ tons.

A Continental model S-4, four-cylinder engine of 4¼ in. bore and 4½ in. stroke is used with a rear axle gear ratio which permits a maximum speed of 35-40 m.p.h. when the vehicle is fully loaded. Expanded steel wheels of 20 in. base diameter are used all around and are equipped with 30 x 5 in. truck type cord tires in front with 32 x 6 tires at the rear.

Parallel pressed steel side channels which are 5 in. deep with a thickness of ¼ in. and flange width of 2½ in. are tied together by three channel cross members and gussets to form the frame. An integral channel type bumper also acts as a cross member and is reinforced by a wood filler block. Additional frame strength is provided by the conventional Standard step bracket construction and rear spring anchor bolts which extend clear across the chassis. The length back of the dash is sufficient for a 14-ft. bus body with no overhang; also the length from the back of the driver's seat to the end of the frame will accommodate a 10-ft. truck body.

As the engine and gear box are combined in a unit through the usual bell housing construction, three-point support is used with a barrel mounting at the timing gear case and two arms at the flywheel housing. Electric starting and lighting are standard, as is battery ignition, although magneto equipment will be provided at an additional cost of $55. The engine is designed specifically for heavy duty service and is equipped with a heavy three-bearing crankshaft carried in bronze-backed babbitt-lined bushings.

Lubrication of all engine parts is provided by a gear oil pump which supplies oil under pressure to all crankshaft bearings and through drilled connecting rods to the piston pins. A belt-driven fan and gear-driven water pump in conjunction with a continuous fin and tube radiator constitute the cooling system. The radiator core is housed within a cast aluminum shell which carries the head lamps. The engine is covered by a heavy steel hood which is carried on the radiator shell and a pressed steel cowl. To facilitate cooling, louvres are formed in the side panels of the hood.

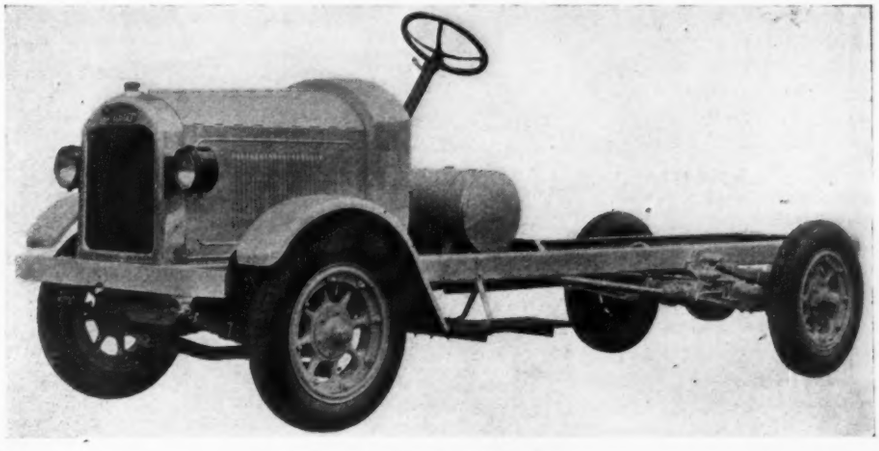
A conventional three-speed and reverse gearset with center control is carried at the back of the engine, the intermediate unit being a multiple-disk clutch. The emergency brake drum is carried on the tail shaft of the gearbox and the drive is transmitted to the rear axle by a jointed propeller shaft. Enclosed metal universal joints are fitted at both ends of the two propeller shaft sections and the intermediate support is an S K F self-aligning bearing which is mounted in a bracket on the center cross member.

A full-floating banjo type Columbia rear axle equipped with spiral bevel gears is employed. External band brakes bearing on drums at each rear wheel form the service braking equipment. Radius rods, the rear centers of which are set well forward of the rear axle centerline, carry the torque reaction and driving thrust. Consequently the rear springs, which are 3 in. wide and 54 in. long, are shackled at both ends. A drop forged I-section front axle is used. Front springs are 2¼ in. wide and 40 in. long.

Left hand steering through a worm and half-worm wheel is standard equipment. Manual controls for the carbureter and ignition are located under the large diameter steering wheel. A welded cylindrical gasoline tank of 35 gal. capacity is mounted in saddles on top of the frame at the location of the driver's seat. All chassis lubrication points are fitted with pressure gun attachments.

Correction in Hupp 8 Prices

THE sedan model of the new Hupmobile eight-cylinder line lists at $2,375 and not at $2,325, as given in AUTOMOTIVE INDUSTRIES of Jan. 1.



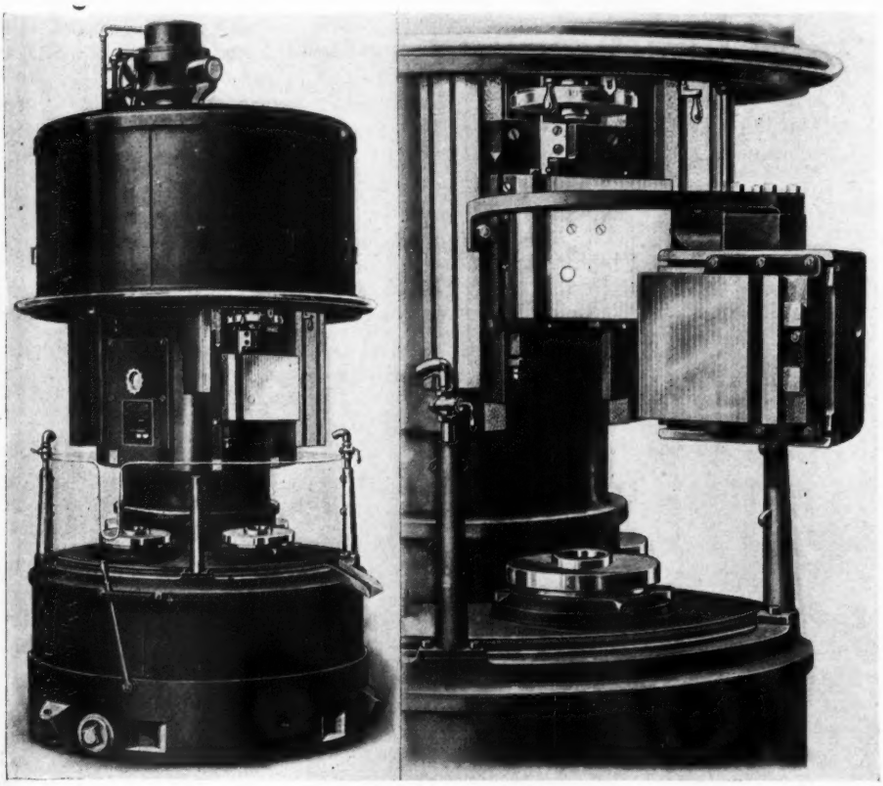
Fisher Fast Freight chassis.

New or Improved Machines Recently Developed

TO meet the requirements of manufacturers whose production schedules do not call for the maximum quantities of which its six-spindle Mult-Au-Matic is capable, the Bullard Machine Tool Co. of Bridgeport, Conn., has brought out a four spindle type designed along the same lines. Owing to the smaller number of available working units in the new machine, the variety of operations which can be accomplished in one chucking is more restricted, but the important feature of automatic mechanical control of all operating functions is retained, and provision is made for independent setting of speeds and feeds for each of the working stations.

The new machine comprises four production units under automatic central control, with four work-holding spindles mounted in the carrier and four stations provided about the central column. The first station, which is without tools, permits the operator to unload the finished work and chuck the rough piece while the spindle stands idle. Stations 2, 3 and 4 are provided with universal tool-carrying heads which may be set independently in speed and direction.

Where sufficient tooling capacity for certain work is not available with the three universal main heads, a supplementary side head may be mounted. Provision is made on the supporting column for the application of this unit at any of the three working stations. It is therefore possible to employ the tooling capacity of six heads in the machining of any piece, if required. This side head unit is mounted on a bearing provided on the central column and is braced by an arm which extends across the column face. Tool holders are clamped to the face of the tool slide.



Bullard four-spindle Mult-Au-Matic showing main head and supplementary side head at one of the working stations

Vertical adjustment on the side head is permanently set by hand at the proper point to suit each job, and horizontal, vertical and inclined cuts may be taken. The traverse of the side head may be limited to anything between 3 and 6 in. The total traverse includes both the rapid traverse and the feed, the proportions and rates of which are in direct relation to the main head at the same station.

The cycle of operating functions begins with the indexing of the carrier and a presentation of new work at each station. All tool heads rapidly advance to the point of cutting at a rate which is constant at all times and bears no relation to the feed. At a predetermined point rapid traverse is stopped and the feed motion is engaged, the cuts then proceeding at the respective rates set independently for the stations. Upon completion of the work the tools and head are retired under rapid traverse through the same paths by which they advanced. As the last head to complete its work returns the indexing mechanism is automatically tripped and the cycle is repeated.

The machine takes work up to 8 in. in diameter and 6 in. in height. The floor area required is 67 in. in diameter and the machine is 128 in. high.

For Boring, Drilling and Tapping

A PRODUCTION type of machine, adapted for accurate boring, drilling and tapping operations, has been developed by Baker Brothers, Inc., of Toledo, Ohio, and is known as their Two-Way Automatic Horizontal Boring and Drilling Machine. It is made in two types, the No. 3 machine being for single spindle opposed operations and the No. 3M machine for multiple spindle opposed operations.

One automotive part which can be handled to advantage in the No. 3 machine is the gear carrier or differential carrier of the rear axle, in which the seats for the bearings of the differential must be bored and threaded. In the photograph reproduced herewith the machine is shown tooled up for this operation.

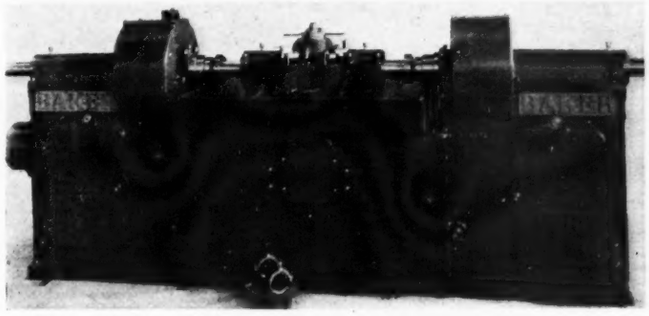
After the operator has chucked the work he presses the starting button, which causes the spindles to move rapidly toward the work. Then the boring operations are performed at the correct rate of feed, and finally the ends of the bored holes are tapped for the nuts by means of which the mesh of the bevel gears is adjusted. The tapping operation is performed with a positive lead to the tap. When the operation is completed the spindle is automatically withdrawn and the machine stopped automatically.

It will be noticed from the illustration that the machine is built in three sections, the center section being built in different lengths to meet different requirements. Special tooling and fixtures are used for different operations.

for Speeding Up Processes of Car Production

As regards the design of the machine, the spindles are mounted in adjustable bronze bushings at both ends, these being of such size, it is claimed, as to insure accurate spindle alignment and to obviate chatter. They are arranged with a No. 4 Morse taper and a special driving slot. The spindles are actuated by flat cams, giving them automatic rapid advance, feed and quick return. The spindles are timed to each other to meet requirements of operation. The cams and feed mechanism are accessible through two doors at the front.

The machine is furnished for either belt or motor drive, though motor drive is said to be preferable and is recommended. A 5-hp. motor with a normal speed of 750 r.p.m. is required and is coupled directly to the main drive shaft. A solenoid brake applied to the armature



Baker No. 3 two-way automatic horizontal boring and drilling machine showing tools for boring and tapping differential carrier

shaft insures immediate stopping of the spindle at the completion of the cycle of operations.

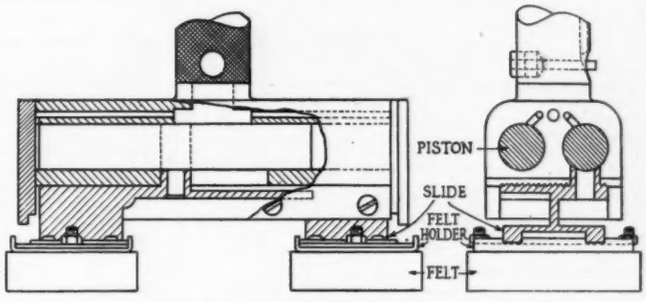
For multiple operations the No. 3 M machine has been designed, which is slightly different in head design. In this machine the entire head carrying the spindles slides on scraped ways.

For Rubbing, Polishing and Sanding

ABOUT twenty years ago the engineering department of the Rockford Tool Co., Rockford, Ill., set out to develop mechanical means for rubbing and polishing finished surfaces. The first model built had a flexible shaft which carried the power to a rotating disk covered with felt. This was not very successful, as the machine was difficult to handle and control. A second model made contained a small electric motor. This was an improvement, but still it was not satisfactory, as spiral or circular marks were left on the work and the pumice and other polishing material would get into the working parts of the motor and destroy the bearings.

They believed that a rubbing machine, in order to be successful, must imitate the operation of hand-rubbing; that is, it must have a reciprocating movement. This led to the development of the Rockford rubbing machine which has been on the market for many years and passed through various stages of evolution.

The latest design of this rubbing machine, known as the Superior, is illustrated herewith. As may be inferred from the sectional view, the machine operates by com-

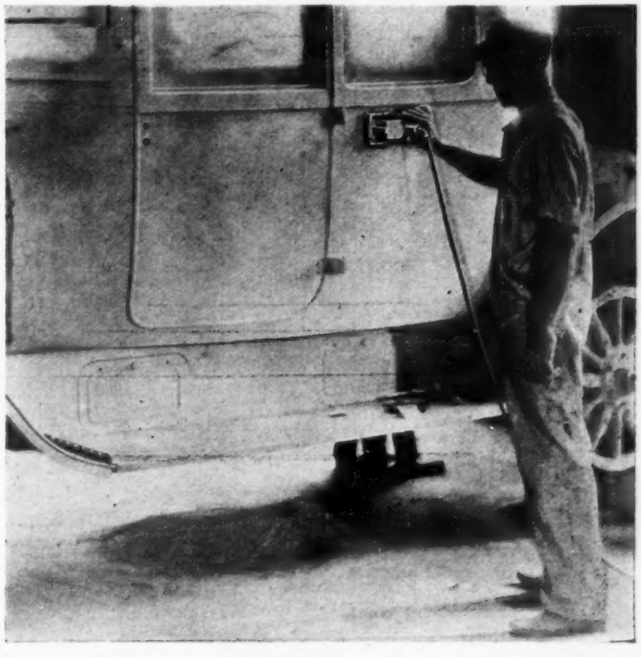


Sectional view of Paasche pneumatic rubbing machine

pressed air. There are two parallel cylinders containing plain solid pistons, and the felt holders are fastened directly to these pistons. Admission and exhaust ports are controlled by the pistons.

All wearing surfaces are of tool steel or case hardened, and the machine for this reason is quite durable and does not occasion much maintenance expense, it is claimed. It is also completely balanced and therefore free from annoying vibration. One of these machines is claimed to enable an operator to perform from two to three times as much work as by the old hand method, without undue fatigue. The constant exhaustion of spent air is claimed to keep the machine free from all accumulations of abrasives.

The machine is furnished complete with a 12 ft. length of extra heavy air hose and couplings, air cocks, counterbalance weights and pulleys, grease gun, 1 lb. can of grease and extra felt holder plates with felt attached. The manufacturers are the Paasche Air Brush Co., 1909 Diversey Parkway, Chicago, Ill.



Showing use of rubbing machine on automobile body

Exports of Cars, Trucks and Tires for

COUNTRIES	GASOLINE PASSENGER CARS								TRUCKS						ELECTRIC VEHICLES	
	Up to $500		$500 to $800		$800 to $2000		Over $2000		Up to 1 ton incl.		1 to 2½ tons		Over 2½ tons			
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Austria							2	$8,299								
Azores and Madeira Islands	6	$2,764	2	$1,490												
Belgium			28	22,198	103	$122,790	9	29,420	10	$5,000						
Bulgaria					1	1,625										
Czechoslovakia	1	500														
Denmark	2	1,500	12	9,750	21	26,590	1	3,168	5	5,083	8	$13,844				
Esthonia																
Finland			3	2,225	5	6,106										
France	5	1,560			60	71,813	3	8,171								
Germany	5	2,696	13	9,208	66	95,017	16	42,556								
Gibraltar			1	771												
Greece	13	4,936	16	10,915	12	16,008	1	2,935	5	1,650	7	9,804				
Hungary					2	2,212	1	2,927								
Iceland and Faroe Islands																
Italy	505	142,732			1	1,321	2	6,438	275	70,703						
Latvia					3	3,682										
Lithuania																
Malta, Gozo and Cyprus Islands																
Netherlands	1	500	27	22,424	112	136,744	14	42,684	1	1,046					12	8,000
Norway	11	4,760			4	4,364					5	8,770				
Poland and Danzig			3	2,493	10	12,434										
Portugal	9	3,950			11	12,943			6	1,533						
Rumania					13	16,136	2	5,050	4	2,000						
Russia					1	1,500			1	408	25	10,200				
Spain	56	27,693	37	30,483	143	183,017	17	44,768	27	13,660						
Sweden	2	1,000	7	4,962	56	70,594	2	5,589			10	15,292				
Switzerland					33	45,308	2	6,134								
Turkey																
England	10	2,455	255	195,432	298	353,039	21	59,248	3	2,892						
Scotland																
Ireland	2	300	18	14,056												
Yugoslavia, Albania and Fiume			1	574												
United States																
Canada	61	13,484	135	89,583	181	211,593	21	69,745	27	20,421	38	54,910	5	11,786		
British Honduras	2	550	1	600												
Costa Rica	1	417	5	3,854	7	9,103			2	1,018						
Guatemala					26	35,452										
Honduras			3	2,171					5	2,029						
Nicaragua	2	960			2	2,172										
Panama	10	4,433	6	4,110	41	47,004	1	4,760	3	1,531						
Salvador	19	9,486	8	6,347	35	40,776	6	15,695	2	1,010			1	3,500		
Mexico	638	209,622	186	112,396	160	177,483	12	31,760	101	54,102	7	19,892				
Miquelon, Langley and St. Pierre																
Newfoundland and Labrador					1	1,292										
Barbados	11	4,281	5	4,824					1	356						
Jamaica	6	2,120	11	8,770	17	18,508			8	2,848	4	6,620				
Trinidad and Tobago	9	4,124	2	1,656	1	1,500			7	2,761						
Other British West Indies	6	2,420	1	700	5	5,657	1	4,000	1	720						
Cuba	221	75,408	8	5,332	66	78,624	39	97,291	45	11,064	5	14,187	6	24,220	1	2,792
Dominican Republic	14	4,810	11	7,384	11	13,652			6	2,992	1	2,952	1	2,827		
Dutch West Indies	4	1,586	1	838	6	6,275			4	1,424						
French West Indies									1	408						
Haiti	4	1,574	1	515	3	3,893			2	880						
Virgin Islands	1	500	1	800	1	1,106										
Argentina	461	223,582	362	255,008	419	498,377	23	62,612	26	25,022	21	30,148	28	71,291		
Bolivia	9	4,529					2	6,162	10	5,000						
Brazil	99	33,303	128	94,746	94	106,474	27	81,444	150	40,729	1	1,182	1	4,461		
Chile	163	33,278	6	4,302	22	26,927	11	32,867	114	34,120	13	18,886	3	10,410		
Colombia	28	12,339	20	14,272	25	32,719	3	9,117	18	7,425	16	27,080	1	6,121		
Ecuador	11	4,707	2	1,148	9	12,387			4	2,582	2	2,773				
British Guiana	6	2,919	2	1,420												
Dutch Guiana	1	479														
French Guiana									4	1,528						
Peru	44	16,856	17	12,736	34	41,740	6	21,694	72	26,608	19	24,786	4	24,287		
Uruguay	297	82,845	89	59,428	64	73,917	5	13,846	146	42,679	2	2,966	2	6,720		
Venezuela	60	22,909	18	13,129	30	36,225	3	7,440	45	21,907	3	5,085	6	24,829		
Aden																
British India	37	19,883	30	22,451	18	18,408			25	22,283	3	6,107				
Ceylon	7	3,265	2	1,396					2	2,593	4	5,445				
Straits Settlements	7	3,738	37	28,591	24	27,044										
China	8	3,795	21	15,510	33	39,911			1	300						
Chosen	2	950														
Java and Madura			47	39,452	21	23,003										
Other Dutch East Indies			22	15,615	7	7,039										
Hejaz and Arabia	12	4,368			3	5,181										
Hongkong			4	3,531	5	5,996			15	6,120	1	2,106				
Japan	13	3,855	4	2,894	63	70,084	2	7,677	4	3,404	2	3,300	2	9,927	2	2,917
Kwantung			8	4,944												
Palestine and Syria	2	1,026	11	7,913	25	32,257			2	1,573						
Persia	6	2,184														
Philippine Islands	69	29,676	70	60,290	55	70,111	14	42,682	44	16,570	10	11,028				
Siam	4	1,858														
Turkey																
Australia	1,361	531,426	1,040	659,066	891	990,114	28	73,557	72	63,356	66	104,681	66	178,237		
British Oceania																
French Oceania	2	825	3	1,722	1	1,995			3	1,596						
New Zealand	68	32,817	28	19,395	145	158,818	4	11,720	30	29,592	13	23,178	4	13,094		
Other Oceania																
Belgian Congo	4	1,304							27	9,096						
British West Africa			2	1,595	2	2,298			5	6,330	42	45,446				
British South Africa	62	33,054	207	156,185	195	220,160			6	4,819						
British East Africa	12	3,521	2	1,561	9	8,727			5	2,979						
Canary Islands	7	3,655	15	12,259	1	1,235			4	2,000						
Egypt	22	10,943	13	9,583	3	3,024			2	1,000						
Algeria and Tunis																
Other French Africa	9	2,782	2	1,407					22	6,896	1	1,092				
Liberia									1	300						
Morocco	39	14,040	3	2,450	2	2,016			6	2,448						
Portuguese East Africa			2	1,527	2	2,210			2	974						
Other Portuguese Africa	2	1,224														
Spanish Africa	2	1,000							3	1,000						
Total	4,573	$1,682,056	3,025	$2,102,387	3,720	$4,355,730	301	$861,456	1,437	$603,893	331	$474,065	130	$391,710	15	$13,709

November, 1924 | Canadian Exports

PARTS	TIRES						PASSENGER CARS						TRUCKS		PARTS	COUNTRIES
	Casings		Inner		Solids		Up to $500		$500 to $1000		$1000 and over					
Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
$1,312	6	$ 0														Austria
1,255	70	1,369	64	$99												Azores and Madeira Islands
628,385	4,176	45,361	3,527	4,361			18	$6,356	9	$5,175					$172	Belgium
53	39	679	127	192												Bulgaria
214									1	525						Czechoslovakia
609,646	3,465	41,591	1,544	2,427	45	$1,043	60	21,500							1,791	Denmark
	220	3,3 6	150	267												Esthonia
3,555	261	3,730	445	699					6	4,300					37	Finland
653,339	5,142	54,163	4,913	6,281												France
22,502	185	3,089	454	818					15	14,754						Germany
29																Gibraltar
11,877	612	9,223	1,446	2,507	28	1,017			2	1,051						Greece
92									1	967						Hungary
620	57	881	53	83												Iceland and Faroe Islands
35,232	603	8,488	668	1, 12	36	851										Italy
681	7.	1,478	252	589												Latvia
663																Lithuania
2,304	4	66					1	439								Malta, Gozo and Cyprus Islands
32,960	1,800	17,792	1,910	7,540	37	1,023			8	7,579	1	$1,154			6	Netherlands
18,032	1,522	15,50	303	609	97	3,76									14	Norway
7,214	6	116							2	900						Poland and Danzig
3,406	304	3,503	2,882	5,689												Portugal
1,984	395	3,800	600	680												Rumania
4,984	17	281	5	17												Russia
6,020	813	17,016	705	1,791	164	2,951									3	Spain
83,579	2,258	27,985	605	997	64	3,236	2	838	2	1,226					681	Sweden
5,424	285	5,653	711	3,135												Switzerland
739																Turkey
344,443	13,452	135,316	6,079	10,156	1,873	38,017	200	29,954	43	33,092	75	112,453	2	$3,584	41,692	England
5,679	752	4,136	10	58												Scotland
26,616	101	626	187	211											2,306	Ireland
378																Yugoslavia, Albania and Fiume
							12	2,025							5,026	United States
989,314	7,888	69,867	7,509	9,762	269	7,221										Canada
502	14	144	20	29					1	507						British Honduras
929	90	1,801	53	8					2	1,928	2	2,621			8	Costa Rica
2,009	11.	2,114	127	259	4	11					2	2,621				Guatemala
2,230	215	3,192	346	614	8	512									10,000	Honduras
1,472	145	915	225	432	2	100										Nicaragua
10,442	1,430	14,240	530	826	54	1,380										Panama
4,360	308	5,619	397	884	24	1,069									82	Salvador
72,785	7,940	79,184	6,023	9,81.	139	2,608					12	14,420			80	Mexico
167																Miquelon, Langley and St. Pierre
524	23	610	44	64											351	Newfoundland and Labrador
2,143	28	265	36	53	7	121	2	878							143	Barbados
9,574	642	9,783	237	562	26	683	6	2,632			1	2,050			32	Jamaica
2,691	171	2,222	49	86	6	166			1	967	1	1,178			72	Trinidad and Tobago
4,694	175	2,430	93	201					1	505	2	2,347				Other British West Indies
81,982	4,522	46,537	6,027	8,679	1,006	24,356			3	2,836	3	3,710				Cuba
18,416	1,264	13,208	1506	2,397	94	3 010										Dominican Republic
1,281	236	2,588	30	612			1	448								Dutch West Indies
901	4	82														French West Indies
5,140	152	2,575	222	509												Haiti
600	78	938	36	75	18	22										Virgin Islands
710,689	12,713	127,350	14,091	20,057	483	12,873	194	93,764	44	28,439	47	60,660			54,451	Argentina
1,200	48	878	51	135												Bolivia
432,758	4,722	36,269	4,110	3,542	61	1,905	14	6,008	31	24,178	14	16,985			53,823	Brazil
42,091	812	15,012	333	713					1	617						Chile
21,766	572	11,527	662	1,280	120	4,899					8	7,861				Colombia
3,377	127	2,493	138	301	12	417									127	Ecuador
1,481	12	146	60	69			4	1,571							19	British Guiana
266	12	137	34	60			1	416								Dutch Guiana
																French Guiana
53,850	881	18,375	1,147	2,699	76	2,749	8	3,824	1	645						Peru
23,249	1,582	17,516	723	2,565	4	94	35	15,709	5	3,183						Uruguay
15,066	1,707	23,657	2,829	5,392	2	141		1	416		4	5,160				Venezuela
1,246	24	252	24	30									6	1,956	403	Aden
26,558	1,957	24,538	1,228	1,948	142	3,054	545	205,467	31	18,453	6	6,067	258	94,162	11,537	British India
4,916	70	1,619	99	364			28	10,557	13	8,781			48	18,622	2,416	Ceylon
35,006	670	16,181	1,654	2,417	223	4,716	161	55,247	29	18,096	1	1,215	44	14,612	12,007	Straits Settlements
7,078	829	10,723	923	1,162	31	557	1	600								China
2,209	237	2,198	234	495												Chosen
19,978	1,437	15,450	48	211	207	5,400	194	60,282	3	1,798			47	15,608	15,868	Java and Madura
6,358	119	1,481	100	215												Other Dutch East Indies
1,593	48	1,936	46	103												Hejaz and Arabia
5,561	5	103	5	17	6	130	2	871								Hongkong
49,408	4,506	35,760	3,026	3,911	169	3,315	17	6,702	6	3,008	1	1,500				Japan
3,305																Kwantung
16,522	250	3,759	187	460	1	39	2	938	7	4,677					18	Palestine and Syria
100																Persia
49,196	1,986	22,701	1,512	2,732												Philippine Islands
852	72	1,189			231	6,160	17	4,386					12	3,912	1,934	Siam
874																Turkey
219,054	5,942	86,652	3,577	7,615	876	22,954	1160	333,519	4	2,301	3	3,514	810	262,146	16,551	Australia
561			27	31												British Oceania
1,123	24	217	23	54	6	280										French Oceania
66,678	2,795	38,338	1,267	3,177	501	16,262	426	168,200	473	361,850	70	81,998	162	56,926	8,910	New Zealand
465	39	447	22	47			2	936					1	326	1,090	Other Oceania
742																Belgian Congo
10,446	156	2,288	248	442			21	6,201					10	3,370	4,262	British West Africa
73,955	796	10,891	1,816	4,051	31	1,244	98	40,110	27	15,795	3	3,483	7	2,386	7,875	British South Africa
2,298	347	14,941	91	259			36	13,020			1	1,011	36	12,950	4,915	British East Africa
2,834	586	7,511	291	511	62	1,602										Canary Islands
9,328	491	5,888	640	1,019			7	3,283	29	16,533	1	1,154				Egypt
35																Algeria and Tunis
1,568	36	318					5	1,670					10	3,260		Other French Africa
180																Liberia
5,667																Morocco
5,596							7	3,085	3	1,587					6	Portuguese East Africa
4,457	263	2,408	526	725												Other Portuguese Africa
373																Spanish Africa
$5,416,684	109,935	$1,224,821	93,278	$155,469	7,245	$183,069	3,288	$1,101,752	808	$589,342	256	$333,113	1,453	$513,784	$264,711	Total

Many New Standards Are Formulated by S.A.E. Committee

Latest report deals with differential gears, compression type gasoline fittings, flexible disks, truck batteries, and a variety of other subjects.

CONSIDERABLE progress in the formulation of standards has been made by the Standards Committee of the Society of Automotive Engineers since the last summer meeting. The current report of the committee considered at the annual meeting this week deals with proposed standards for differential gears, compression type gasoline fittings, flexible disks for universal joints, license plate brackets, truck batteries, various screw thread matters, a few headlamp items, among other subjects.

The Differential Subdivision of the Axle and Wheels Division has been working on standard designs of differential gears since early in 1922 and has made several recommendations since that time, without, however, getting anything adopted as recommended practice. At this meeting the subdivision proposed for adoption as recommended practice of the society designs for two sizes of differential gears, with 18-10 and 20-11 gear combinations, respectively. Dimensioned drawings of the pinions, spiders and side gears, and three designs of housings were shown, for two-piece case type mounting, two-piece spider-type mounting and one-piece case mounting. The dimensions for the housings were given in tabular form. This same proposal has been before the American Gear Manufacturers Association and illustrations of the cases appeared in the report of the last meeting of that association printed in these columns.

A set of proposed standard dimensions for compression type fittings intended for copper tubing connections, most of which were submitted at the summer meeting of the society last June, but withdrawn by action of the council of the society because of some uncertainty regarding the patent situation in respect to such fittings, were submitted again with the addition of the 7/16-in. size and the following clause:

> "Adoption of this standard by the Society does not insure users of constructions incorporating this standard against liability for infringements of any patents that may exist and does not constitute a recommendation of any patented or proprietary application that may be involved."

Recommendations of the Parts and Fittings Division pertaining to these fittings are given in the accompanying tables and cuts.

Parts and Fittings Recommendation

A careful survey of the various requirements and practices in reference to flexible disks used for generator, pump and similar drives has indicated that many needless variations in dimensions existed. In consequence the Parts and Fittings Division presented the accompanying table giving the dimensions of six sizes which are believed to meet all requirements for this class of service.

Four-Bolt-Type Non-Metallic Flexible Disk Dimensions

Nominal Size	Outside Diameter ±0.020	Inside Diameter ±0.020	Bolt-Circle Diameter ±0.008	Distance Between Bolt-Holes ±0.010	Bolt-Hole Diameter +0.010 —0.000	Thickness +0.020 —0.010
2¾ x ¼	2.750	1.000	2.000	1.414	0.250	0.250
3 x ¼	3.000	1.250	2.250	1.591	0.250	0.250
3¼ x ¼	3.250	1.250	2.500	1.768	0.312	0.250
3½ x ¼	3.500	1.250	2.750	1.944	0.312	0.250
3¾ x ¼	3.750	1.250	3.000	2.121	0.312	0.250
4 x ¼	4.000	1.500	3.125	2.210	0.312	0.250

Another recommendation of the Parts and Fittings Division deals with the dimensions and location of slots for license plate brackets. It contemplates the use of two slots each of which is 3 in. long by 9/32 in. wide, spaced 7¼ in. apart, center to center, with the long axis in the same straight line. This makes the inner ends of the slots 4¼ in. apart and the outer ends 10¼ in. apart.

Proposed Dimensions for Sleeves, Nuts and Straight Threaded-Ends

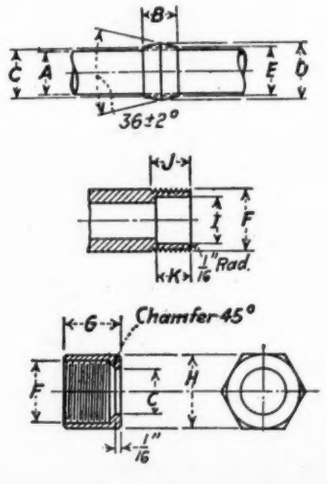
Tubing Diameter *A* ±0.002	*B*	Sleeve Bore *C* ±0.002	Stock Diameter[1] *D*	Small Diameter of Taper *E*	*F*[2]	*G*	*H*	*I* ±0.002	*J* Minimum	*K*[3]
1/8	3/16	0.130	3/16	0.140	5/16–24	3/8	3/8	0.136	1/4	3/16
3/16	7/32	0.193	17/64	0.205	3/8–24	13/32	7/16	0.196	9/32	7/32
1/4	1/4	0.257	11/32	0.269	7/16–24	7/16	1/2	0.261	5/16	1/4
5/16	1/4	0.323	13/32	0.335	1/2–24	7/16	9/16	0.328	11/32	9/32
3/8	1/4	0.386	15/32	0.398	17/32–24	15/32	5/8	0.391	3/8	5/16
7/16	5/16	0.444	17/32	0.455	19/32–24	1/2	11/16	0.449	11/32	11/32
1/2	3/8	0.515	5/8	0.527	11/16–20	5/8	13/16	0.531	7/16	3/8

All dimensions in inches.

[1] A short flat will appear on the sleeves for the ¼, ⅜ and ⅝-in. sizes as a result of the stock diameters selected.

[2] All threads shall be in accordance with the Fine-Thread Series, Free (Class 2) Fit as given in the S.A.E. Standard for Screw-Threads.

[3] Also minimum usable length of threads on the double-end straight fitting.



It is understood that the license plates of all States can be mounted on a bracket with slots arranged in accordance with these dimensions if holding screws not larger than ¼ in. diameter are used and that all such plates then can be centered on the bracket, with the exception of the Florida plate, which would be 1 in. off center.

A slight change in specification No. 69 for wrought aluminum bronze has been approved by the Non-Ferrous Metals Division. This consists in raising the copper content limits from 85 to 87 per cent to 87 to 89 per cent.

Efforts of the Storage Battery Division of the Standards Committee during the past year were devoted to the standardization of storage batteries for heavy duty motor trucks using gasoline as fuel, and it was proposed to insert the following in the Specifications for Storage Batteries:

MOTOR TRUCK STORAGE BATTERIES

These specifications are intended to apply only to lead-acid storage batteries for heavy duty motor trucks.

Compartments.—Battery compartments shall be of metal of not less than No. 18 U. S. S. gage (0.050 in.), and supported entirely by the chassis.

The inside width of the compartments shall be 8 in. and the height from the bottom shall be 11½ in. The inside length shall be 12, 14¾, 15½ or 18¾ in.

The battery shall rest on two wooden strips, each 2 in. wide and ¼ in. thick, running lengthwise of the compartment and positively spaced with the edges flush with the sides of the battery.

Hold Down Devices.—Hold down devices shall be attached at the top of each end of the battery case, not at the top of the handles. The diameter of the hold down rods shall be 5/16 in. The diameter of the rod holes in the hold down devices shall be 7/16 in., and their centers shall be ½ in. from the ends of the battery case. Hold down devices shall not extend more than ¾ in. beyond each end of the battery case.

Motor Truck Storage Battery Dimensions

Battery No.	Minimum Capacity, Amp.-Hr. No. of Cells [1]	5-Hr. Rate	20-Min. Rate	Maximum Overall Dimensions, In. Length [2]	Width	Height
11.....	3	45	..	10¼	7⅝	10¾
12.....	3	60	..	12½	7⅝	10¾
13.....	3	75	37	13⅝	7⅝	10¾
14.....	3	90	45	15⅞	7⅞	10¾
15.....	3	105	52	17	7⅞	10¾

[1] Side-to-side assembly of cells shall be used as shown in the top drawing.
[2] The overall end-to-end length includes handles, but not hold down devices. The handles and the hold-down device shall be attached only to the ends of the case. Terminals and connections shall not extend above the handles the latter shall be highest point.
Batteries Nos. 11 and 12 are for lighting service only; batteries Nos. 13, 14 and 15 are for combined starting and lighting service.

Three sizes of tray terminal are proposed by the Electric Vehicle Division. These are hook-shape lugs with flat bearing surfaces where the screw clamp fits and hollow barrels into which the lead wire is sweated. The three sizes are termed Nos. 2, 00 and 0000, respectively.

Heretofore the class of fit to be used for screw threads involved in various standards adopted by the society have been specified only in a few cases. Now that the National Screw Thread Commission has formulated standards for various classes of fits which have been adopted by the society, the Screw Threads Division has reviewed the existing standards and recommends that the following classes of fits be employed:

Identification symbols used are as specified in the American Standard. The basis of the system is the initial letters of the thread series, followed by the number of the class of fit. Thus, a threaded part of 1 in. diameter with 14 threads per inch and with the Free (or Class 2) Fit, would be indicated as 1 in.-14-NF-2. The letter N is used as a symbol for the American Standard because of the fact that it is used in the report of the National Screw-Thread Commission and it is desired to have all practice in this country uniform.

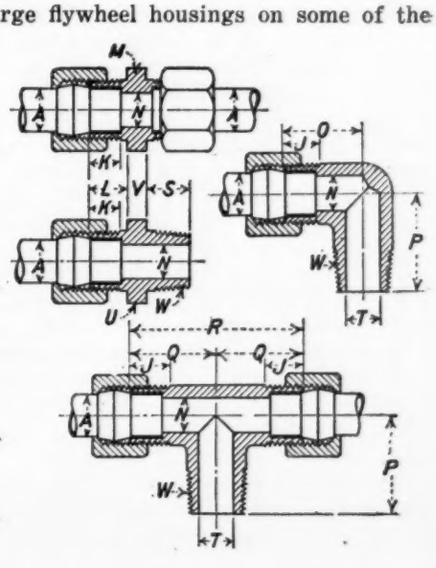
Flywheels and flywheel housings
Flywheel housing flange holes .....NC—2
Disk clutch bolts ...NC—2
Cone clutch thread.NC—3
Tractor housing bolts NC—2
Connecting rod bolts
Body threads .....NF—3
Carbureter flanges
Cap screw holes....NC—2
Fan belts and pulleys
Spindles .....NF—2
Set screw holes ....NC—2
Radiators
Cap screw holes ...NC—2
Water pipe flanges
Cap screw holes ...NC—2
Headlamps
Fork threaded ends.NF—2
Bracket bolt and nut NF—2
Tail lamp mounting
Bracket bolts .....NC—2
Motorcycle headlamp mounting
Prongs .....NF—2
Magneto mountings
Shaft end threads..NC—2
Cap screw holes ...NC—2
Timing lever holes.NF—2
Generator mounting
Flange type shaft end NF—2
Bracket type shaft end NF—2
Cap screw holes....NC—2
Starting motor mounting
Barrel type .....NC—2
Screws, bolts and nuts
Body threads .....NF—2
High nuts
Threads ..NF (or NC)—2
Machine screw nuts
Threads ..NF (or NC)—1
Rod ends
Threads .....NF—2
Pressure gage connections
Threads .....NF—2
Ball and socket joints
Threads .....NF—2
Ball studs
Shaft end .....NF—2
Tire pump mounting
Cap screw holes....NC—2
Front axle hubs
Hub bolts .....NC—2
Spindle thread ....NC—3
Spring rebound clips
Bolt threads .....NC—2
Spring center bolts
Body threads .....NF—2
Central lever ball handle inserts
Lever threaded end.NF—2
Carbureter throttle levers
Rod ends .....NF—2
Door locks and handles
Door handle squares NF—2
Top irons
Thread end .....NC—2

A demand for large flywheel housings on some of the

Proposed Dimensions for Elbows, Tees and Unions

Tubing Diameter *A*	*L*	Diameter of Hexagon *M*	*N*	*O*	*P*	*Q*	*R*	*S*	*T*	Diameter of Hexagon *U*	*V*	*W*[1]
⅛	¼	5/16	3/32	5/8	11/16	11/16	1 3/4	3/8	3/16	7/16	5/32	1/8
5/16	5/32	3/8	1/8	5/8	11/16	11/16	1 3/8	3/8	3/16	7/16	3/16	1/8
¼	5/16	7/16	3/16	5/8	¾	11/16	1 3/8	3/8	3/16	7/16	3/16	1/8
5/16	11/32	½	¼	5/8	¾	11/16	1 3/8	3/8	15/64	½	3/16	1/8
3/8	3/8	9/16	5/16	¾	⅞	13/16	1 5/8	7/16	5/16	9/16	7/32	1/4
7/16	13/32	5/8	11/32	27/32	1	29/32	1 13/16	7/16	5/16	5/8	7/32	1/4
½	7/16	11/16	13/32	15/16	1 1/8	1	2	½	13/32	11/16	7/32	3/8

All dimensions in inches.
[1] American Standard Pipe Thread.
Both ends of the unions shall be chamfered 45 deg. to the flats.



very large engines used primarily for industrial purposes led to the recommendation by the Engine Division that a new and larger size housing, to be known as No. 0, be added to the present list. This size has an opening of 25½ in., a bolt circle of 26¾ in., an inside diameter of 28 in. and an outside diameter of 28½ in. The flange is drilled and tapped for 16½-13 cap screws.

This same division added to the present table of engine support arm dimensions a new dimension for the width of rear engine support arms. For sizes number 1, 2, 3, 4, 5 and 2T the respective rear support arm width dimensions are 4, 3½, 3½, 2¾, 2¾ and 4 in. The widths recommended are such as to permit of the use of anti-squeak pads.

After completing a survey in which it was learned that 25 leading car manufacturers will not use bayonet type headlamp doors in the future, that four will use it only in improved form, and that six others will continue to use it as heretofore, the Lighting Division made the following recommendation:

> The headlamp door shall be assembled to the body of the lamp in connection with the reflector by exerting a force in a direction parallel to the axis of the lamp. The force required to assemble the door shall be maintained as compression on the sealing material by a convenient locking device, such compression to be set or released from the outside of the lamp by a mechanical device that will remain assembled with the lamp, the door or the lock ring when the compression is released. Suitable means shall be provided in the lamp construction to prevent the lamp glass from falling out of the part to which it is assembled, when the headlamp is opened.
>
> These requirements are intended to exclude the use of the conventional bayonet type of door construction. Certain forms and combinations of materials making up what is known as the rotating type of door are easily accessible, however; but when this type of door construction is used, one of the metals at each point of metal-to-metal contact where there is an abrasive action shall be non-ferrous and the other shall be rust-proof.

It is recognized by the division that a bayonet type of door, which locks by the application of a purely rotating force and which has non-ferrous metal in contact with non-corroding material where there is abrasive action, is satisfactory.

In the present headlamp standard the maximum mounting height is specified as 42 in. It is contended by some, however, that more satisfactory illumination is obtained in the case of buses when this limit is exceeded. For this reason the Lighting Division now recommends that the limiting height of 42 in. be considered as applying to passenger cars only.

Non-Sulphating Storage Battery Developed

THE lead accumulator of the conventional type has the disadvantage that it is subject to a slow leakage or spontaneous discharge, and Jumau found that one of his elements lost its whole charge in four months. M. Ch. Fery, who made a thorough study of the causes of this local action, came to the conclusion that it should be possible to construct a storage battery with immovable electrolyte possessing the same advantages as dry cells and, in addition, the valuable property of being rechargeable.

The double sulphation theory of accumulator action is the one most generally accepted at present. On the sole basis of experimental results, and by disregarding all theoretical considerations, M. Fery was able to show that the reversible reaction of the storage battery is as follows:

$$Pb_2 + H_2SO_4 + Pb_2O_6 \rightleftarrows Pb_2SO_4 + 2\,PbO_2 + H_2O$$

Consequently, not only is lead sulphate not formed on both electrodes, as required by the theory of double sulphation, but during a normal discharge this compound is never formed. It is only by accident that this white salt, which is only slightly soluble and has insulating qualities, is produced and gives rise to the phenomenon of sulphation, which is such a bugbear to the storage battery man.

Of the two little known compounds which figure in the reaction formula of M. Fery, one, the black peroxide of lead, Pb_2O_6, was first called attention to by Drewiecky (Bulletin de la Societe Internationale des Electricians, Vol. 6, 1882, page 414), and the other, plombous lead, of a dark gray color, has been prepared recently by Denham (Chemical Society, February, 1919).

It results from the above considerations that the secondary cell operates exactly like other galvanic cells, by producing a salt of the metal attacked at the negative electrode and restoring the depolarizing agent to the positive at a lower degree of oxidation.

The investigation showed that spontaneous discharge (leakage) is due to the combined action of the electroylte and of the oxygen on the negative plate, where the following reaction is produced:

$$Pb_2 + H_2SO_4 + O = 2\,PbSO_4 + H_2O$$

The reaction may be even more complete and give rise to plombic sulphate:

$$Pb_2SO_4 + H_2SO_4 + O = 2\,PbSO_4 + H_2O$$

It is this second reaction which takes place if a discharged storage is left to itself.

In order to prevent this accident, it is only necessary to protect the negative against oxygen, both from the atmosphere and from the positive plate, the active material of which is endothermic and very unstable.

M. Fery then applied to the storage battery the general arrangement which gave him such good results in the sal ammoniac cell with depolarization by the air (Comptes Rendus, Vol. 172, 1921, page 317), in which the zinc is protected against the oxidizing action of the air, which is the cause of local action, by its immersion at the bottom of the cell.

With this very simple arrangement the storage battery acquires all the advantages desirable in a dry cell—high electromotive force, low internal resistance, electrolytic regeneration at low cost, good retention of charge during periods of rest. Finally, this new storage battery is completely immune to sulphation.

A storage battery of this type which was left to itself for twenty-six months lost only 66 per cent of its charge, which, admitting that the loss of charge follows an expaonential law, is equal to a monthly loss of only 4 per cent. At the end of four months such a battery therefore still retains 83 per cent of its original charge while an ordinary battery has lost all of its charge.

The protection of the negative plate against oxidation is said to be so perfect that a discharged element which was left in that state for two years could be normally recharged at the end of that period.

The above is taken from a note presented by M. Fery to the French Academy of Sciences on Nov. 24 last,

One Way to Prevent Wear During Starting Period

Editor, AUTOMOTIVE INDUSTRIES:

Although I had not, at this time, considered my solution for engine wear and scuffed pistons available for publication, the current interest shown in Mr. Jardine's and subsequent articles on this subject prompts me to cause its presentation. Tests are being conducted by two prominent manufacturers, but the data given in the accompanying table are those taken from privately owned cars.

I quite agree with Mr. Jardine that the direct cause of piston scuffing and excessive wear is due to insufficient or no lubrication when the engine is started cold and that the scuffing can in no way be attributed to small clearances. I shall add that this wear stops not alone at the pistons and cylinders, but that lack of initial lubrication is a considerable factor in valve tappet, valve tappet guide and piston pin wear.

Furthermore, inadequate lubrication at starting is responsible for excessive oil dilution.

To preclude the possibility of this lack of lubrication when starting a cold engine and incidentally to obviate lubrication problems at extreme high speeds, I have developed the design described briefly below.

It consists of feeding a stream or spray of oil to the cylinder walls, tappet guides and piston pins (or to any combination as the desire may be) and preferably directing the main portion of this oil to the non-thrust side, said supply of oil being controlled by a relief valve the functioning of which is as follows:

The high pressure side of the relief valve is connected to the main oil pressure line while the low pressure or bleed side is connected to a header which in turn feeds the individual cylinders and tappet guides. It has also been found that certain engines are of such oil pump and piston design that the bleed from the conventional relief valve is of the proper magnitude to provide ample lubrication at starting.

There are two distinct classes of application for this special relief valve, one a fixed pressure and the other a variable pressure automatically controlled by the carbureter choke and auxiliary rods. The latter type can be designed so as to meet the severest conditions of poor manifolding and hence distribution, to present excessive oil consumption at high speeds and to reduce to a minimum the ill effect of forgetting to push in the choke.

In the case of the fixed pressure type, assume a case of an engine operating with a standard relief valve pressure of 30 lb. per sq. in. The auxiliary or cylinder lubricator relief valve is set at 25 lb. Then when the engine is started the pressure in the main oil line rises immediately to at least 30 lb. and hence the auxiliary relief valve opens and bleeds a differential pressure of approximately 5 lb. per sq. in. into the header. After the engine has run a sufficient time for the main line pressure to drop below 25 lb., the relief valve automatically closes and the parts then are lubricated from the connecting rod and main bearing throw-off.

In the choke controlled type it is possible to supply any pressure (up to the main line pressure) when the choke is out and to maintain a pressure in accordance with high speed requirements when the choke is in. This is accomplished by so connecting the choke as to reduce the relief, valve spring pressure to any amount when the choke is out (thus decreasing the differential in pressure between the main oil line and the header), or by restricting the outlet of the main relief valve and keeping a constant auxiliary relief valve spring pressure. In any event a copious supply of oil reaches the cylinder walls and tappet guides and this usually before firing takes place.

The accompanying table gives a synopsis of results from two similar six-cylinder engines of rather poor manifolding, operating under identical conditions.

It should be noted that these tests were designed to subject the engines to conditions which were most severe as regards piston scuffing. The runs never were over three miles duration with speeds varying from 25 to 30 miles per hour and the oil temperature never reaching 50 deg. Fahr.

After completion of these tests observations were continued with engine number 1, with the result that after

Table giving data mentioned by F. S. Baster

Engine Number		1	2
Piston Type		Sand Cast Lynite	Same
Oil Used		Mobile "A"	Same
Gasoline Used		Red Crown	Same
Lubrication to parts during starting period	Pistons	All	1, 3, 6
	Tappets	All	1, 2, 5, 6, 11, 12
Method of Lubrication		Fixed Auxiliary relief 5 lb. differential	Same
Approx. number starts of engine per mile		1	1
No. of miles covered		1021	1002
Oil temperature deg. Fahr.		Never over 50	Never over 50
Initial Clearances	Pistons, in.	All 0.003	All 0.003
	Tappets, in.	All 0.0007	All 0.0007
Connecting Rod* Clearances	Radial, in.	0.002	0.002
	Side, in.	0.004 to 0.006	0.004 to 0.006
Wear (average)	Pistons, in.	No trace	No. 2, 4, 5..0.0031 others no trace
	Tappets, in.	No trace	No. 3, 4, 7, 8, 9, 10.. 0.008 others no trace
Per Cent Dilution		Negligible	21

*Plain bearings, main bearings also plain except metering slot.

28,000 miles of average driving there was no trace of tappet, tappet guide or cylinder wall wear and an average piston wear of 0.0011 in.

Similar tests but with cast iron pistons show after 30,000 miles an average cylinder wall wear of 0.0013 and no piston wear. FOREST S. BASTER.

Removal of Carbon Monoxide From Exhaust Gases

Editor AUTOMOTIVE INDUSTRIES:

Numerous articles published by the U. S. Bureau of Mines and other agencies, again and again have called public attention to the presence of dangerous carbon monoxide in exhaust fumes of internal combustion engines. The danger of a running motor in a small closed garage; polluted atmosphere in congested thoroughfares; complicated problem of ventilating vehicular tunnels; and restricted use of gasoline locomotives in mines—these are but a few of the reasons which make it imperative to find some way of eliminating the poisonous constituent of the exhaust gas.

Carbon monoxide is a product of incomplete combustion. The average motor exhaust is rather rich in carbon monoxide; according to the U. S. Bureau of Mines, 0.5-2 cu. ft. per minute is a conservative estimate of the amount liberated from the average engine.

Apart from purely mechanical improvements, attempts have been made to promote complete combustion by means of special catalytic agents, either introduced into the fuel oil, or applied as coating inside the cylinder. Complete combustion, once assured, will not only dispense with the formation of CO, but also will reflect favorable both on economy and on efficiency of the engine.

Chemistry suggests still another way of rendering exhaust gases more or less harmless: an injection of air into hot exhaust gases, preferably, in presence of suitably located catalysts, tends to oxidize carbon monoxide. Many catalytic agents which promote this reaction are well known. Quite recently, due to the importance of removal of small percentage of CO from the air at room temperature an interesting investigation has been made by the Chemical Warfare Service of the U. S. Army.

Applied to internal combustion engines, the problem of oxidizing carbon monoxide, though greatly simplified by high temperature of the exhaust (600—1000 deg. Fahr. and higher for rich mixture), is at the same time hindered by high velocity and constant formation of deposits which are likely to interfere with the catalytic action.

There are several means of reducing the unfavorable effect of high velocity and deposits, but it probably will require more consistent experimental work before a device which is practical in every respect for doing this can be evolved.

M. N. DVORNIKOFF,
P. N. PETERS.

Theory and Performance of Small Alternating Current Rectifiers

AN investigation of the theory and performance of small alternating current rectifiers as commonly employed for charging storage batteries has been made at the Bureau of Standards, and the results have been published in Technology Paper No. 265, of which H. D. Holler and J. P. Schrot are the authors. Three different kinds of rectifier were studied, namely, the electrolytic (aluminum or tantalum) the thermionic and the vibrator type.

In the case of the electrolytic rectifiers the degree of rectification and energy efficiency were increasd by using high current densities and inductance in series. Their performance curves are very similar in shape to those of the ionized gas rectifier, although, of course, their numerical relations are different.

The efficiencies obtainable with these small rectifiers is comparatively low, not exceeding 50 per cent with the best of them under the most favorable conditions. With the aluminum rectifier this low efficiency is due chiefly to the fact that the electrolyte used is of low conductivity. Solutions of one or more of the ammonium and alkali salts of some of the weak acids, such as the borates, tartrates, phosphates, oxalates, citrates and carbonates, are generally used. These electrolytes must be free from impurities in the form of strong acids and heavy metals, as these accelerate deterioration of the aluminum electrode. Small amounts of the halides are particularly deleterious. The electrode opposite the aluminum is usually of lead, iron or carbon.

For charging small storage batteries at the rate of several tenths of an ampere a solution of sodium acid tartrate, ammonium phosphate or common borax has been found quite satisfactory, a carbon rod and an aluminum wire being used as electrodes, the latter being renewed frequently. If battery carbons are used, care should be taken to remove all traces of salt from the carbon. One of these rectifiers, using a 10 per cent solution of ammonium phosphate, and giving 0.2-0.3 ampere, ran for several hundred hours on continuous service.

A rectifier based on the same principle as the aluminum one but free from some of its defects is the tantalum rectifier. Originally potassium carbonate solution was used for the electrolyte, but recently it has been found possible to use sulphuric acid solution for this purpose. This has a low resistivity and, consequently, decreases the resistance loss inside the rectifier. Furthermore, the resistance of the tantalum to the corrosive action of the electrolyte gives the rectifier a longer life than that of aluminum.

Copies of this paper can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 20 cents each.

AMONG the means now under consideration for relieving traffic congestion in London are one-way traffic, separation of fast and slow traffic and the construction of a great new roadway to the East London docks at a cost of about $17,000,000. Congestion in the dock area slows down London traffic as a whole. At certain points a road width of only 21 ft. is available, and the road is intersected by railway crossings and swing bridges. One of the most interesting schemes to relieve congestion is the construction of a road tunnel (vehicular tunnel) 2½ miles long under the Thames, from a point east of Dartford on the south side of the river, to a point on the north bank, where it would connect with the new by-pass road at Purfleet. This is expected to deflect a large amount of traffic from the London area. It would have a driveway 20 ft. in width, would cost about $15,000,000 and would take three years to complete.

EDITORIAL

A Closed Car Year

IT is common knowledge that 1924 witnessed a great increase in closed car production over 1923. But the gain in 1925 bids fair to be far greater than that of the past twelve months. Estimates received by AUTOMOTIVE INDUSTRIES from practically all the leading producers indicate that many of them are planning even to double their proportion of closed jobs next year.

It might be expected that the small production cars would be planning the greatest percentage increases in closed car production, since swinging a relatively small actual number of cars from open to closed would constitute a fairly sizeable percentage change. This is not the case. Some of the biggest percentage increases in proportion of closed car production are being proposed by companies which stand among the first ten or twenty producers in the industry. One important concern in the first ten expects to discontinue open model production entirely this year.

One reason for the sudden large percentage swing in the big production cars is that the small production outfits of necessity have followed trend of demand more closely and in 1924 already in many cases were building a high proportion of closed jobs.

But the big push is on. This is to be a closed car year with a vengeance.

Measuring Dilution

CRANKCASE dilution has been one of the foremost topics of discussion among automotive engineers in recent years, and we have become accustomed to talking glibly of "percentages of dilution" without stopping to think or inquire just how these percentages are arrived at. Once the fuel gets into the oil it is thoroughly dissolved therein, and as there is constant loss of the mixture while the engine is in operation, it is impossible to determine the proportion of fuel in the oil supply by a mere measurement of volumes.

Since experimentation on crankcase dilution is being carried on at many places, it is quite desirable that some standard method for determining the percentage of dilution be agreed upon, so that it may be possible to compare results obtained by different investigators.

The only direct method of determining the proportion of fuel in crankcase oil is to drive off the fuel by distillation and see what proportion of the volume of the sample remains after the fuel has all been distilled off. It is reasonable to suppose that when the last of the fuel has passed over there will be a rapid increase in the temperature of the vapors generated in the still, and when a certain temperature is reached oil will begin to distill over.

The relation between the amount of condensate collected and the temperature of the still may be represented by a curve. As long as there is any fuel left in the sample this curve will be nearly a straight line, the temperature increasing in almost direct proportion to the amount of fuel condensed. However, when the fuel is nearly all gone the curve begins to swing around, showing a much more rapid increase in temperature for a given increase in condensate than previously.

Presently, as the temperature at which the lighter portions of the lubricating oil distill over is approached, the rate of temperature rise declines again, and the curve takes a swing in the opposite direction. There is, therefore, a point of inflection in the curve, ahead of which it is concave and beyond which it is convex toward the temperature axis. Evidently the percentage of the total sample which has passed over when this point of inflection is reached denotes the percentage of dilution.

Engineering Interests

ENGINEERING problems troubling the industry haven't changed much in the last year, if the program of the annual meeting of the Society of Automotive Engineers be taken as an indication of current technical interests.

This week in Detroit the engineers are talking about balloon tires, wheel shimmy, air-cleaners, crankcase oil dilution, all-metal airplane design and vapor cooling of automobile engines. All of these topics have a familiar sound to the follower of technical trends.

Vapor cooling, as a matter of fact, hasn't been discussed publicly to any great extent in recent months, but a good deal of interest in the subject has been shown by individual engineers.

Recurrence of the same topics does not indicate lack of progress. Advances have been made toward solution of every one of the problems mentioned and the present discussions simply bring up to date the research and investigations which have been going forward constantly.

Big questions cannot be answered over night and the task of the automotive engineer is to solve the problems which service requirements indicate are pressing rather than to seek for sensational ideas to talk about.

The job is prosaic in some ways, but the life of the industry depends on its being done properly.

Our Industry Today—

Increased Automobile Sales for 1925 Are Developing—Slight Uncertainty Still Exists Regarding Prices—Optimism Prevails

NEW YORK, Jan. 19—The increased sales of automobiles expected after Jan. 1 are materializing. Local shows in Philadelphia, Cincinnati, Brooklyn and other cities are developing numerous orders for new cars. Reports from each of these exhibits are optimistic in tone and indicate that good business will develop at practically all of the sectional shows which are scheduled for the next few months.

A slight uncertainty still exists regarding car prices. A strong feeling is general that price cutting is over. Basic conditions lend weight to this view. Parts and material prices threaten to advance; certainly they are not going down. Nothing but competitive forces remain to influence further downward revisions. Even on that score stability appears likely. Cuts already have been made by companies in highly competitive classes. General Motors Corp. held prices steady throughout the price flurry which took place at the New York show, thus carrying out the policy announced by President A. P. Sloane some weeks ago.

Competitive conditions are so keen in certain instances, however, that complete assurance that price changing is over for the time being cannot be present until after the Chicago show next week.

Production schedules are being increased gradually as inventory periods are completed. By the middle of February practically all of the factories will be swinging along at a normal pace. There is no disposition among manufacturers to speed up production past the point justified by sales. It is recognized that the used car will be an important factor in determining the 1925 output of new vehicles and factory schedules will be carefully kept in line with dealer demand.

Continuance of a good bus business and the general upward trend of industry makes truck builders optimistic about sales prospects.

New Mystery Car Shown in Chicago

CHICAGO, Jan. 22—Without name and without price, a new mystery car is being shown at the Auditorium Hotel here during the show. The car has a four-cylinder engine, is low hung, and apparently is to have a production cost as low as possible. No definite information is obtainable with regard to the interests behind the new vehicle, but it is understood that it is being brought out by a prominent Detroit automobile man whose name is familiar to the entire industry. An examination of the car indicates that the price probably will be less than $500.

S. A. E. at Convention Visualizes Advance

New Measuring Instruments and Aviation Engine Described at Detroit

DETROIT, Jan. 22—Remarkable strides in the development of instruments for automotive testing work, numerous suggestions, many of them conflicting as to how wheel shimmy may be avoided and practical ideas about more rapid development of commercial aviating were among the chief developments of the first two days of the annual meeting of the Society of Automotive Engineers, which opened here on Tuesday.

New instruments for measuring noise, for measuring vibration, for measuring fuel and for measuring acceleration were shown in action at the research session, which opened the meeting. J. A. C. Warner, research manager of the S. A. E., described the operation of the various instruments and showed how they are being applied to practical engineering problems.

W. B. Stout, president of the Stout Aeroplane Co., said that aviation can be made to pay its own way, and that it cannot be considered successful until that point has been reached.

Aviation Engine Developed

L. M. Woolson of the Packard Motor Car Co. told of a new aviation engine developed by Packard, which is lighter and, it is claimed, more efficient than the Liberty engine. Mr. Woolson predicted, for the near future, construction of aviation engines which will develop 1 hp. per pound of weight.

E. G. Budd said that skilled upholsterers have been practically eliminated by the production methods developed in the construction of the all-metal body. Nearly all of the upholstery work now is bench work, he said.

George W. Kerr of the Reo Motor Car Co. described the Weyman body construction, which has become rather prominent in Europe. Paul Geyser of the Yellow Cab Manufacturing Co., commenting on Mr. Kerr's paper, said that the Yellow organization has in operation some 15 bodies of this type for experimental purposes.

Wheel Shimmy Discussed

Wheel shimmy turned out to be a bone of contention, as usual. Otto M. Burkhardt of the Pierce-Arrow company; W. R. Strickland, Cadillac; Russel Begg, Jordan; B. J. Lemon, U. S. Rubber Co.; S. A. Huebotter, F. F. Chandler, Ross Gear; R. B. Day and others analyzed the phenomena and told how they believe it can best be overcome. Opinions differed widely, some advocating stiffer springs and others more flexible springs, some blaming shimmy on balloon tires and some on steering gears. Before the session ended the subject was threshed out very thoroughly.

President-elect Henry L. Horning announced the following committee chairmen for 1925: Finance, A. R. Erskine; House, David Beecroft; Meeting, T. J. Litle, Jr.; Membership, A. F. Masury; Sections, J. H. Hunt; Publications, E. P. Warner, and Constitution, A. L. Riker.

Attendance at the session totaled over 600. The carnival was held Wednesday evening at the Oriole Terrace and was well attended.

Standards Committee Meets

DETROIT, Jan. 22—The Standards Committee of the Society of Automotive Engineers, which met here yesterday, adopted 15 recommendations of its divisions substantially without change. The recommendations covering bayonet type head lamps, method of gaging slots and castellated nuts, tolerances on screw threads, differential gears, spiders and cases, license plate bracket slots, flexible disks, truck battery sizes, No. 0 flywheel housing, widths of engine supporting arms, change in specifications No. 69 for wrought aluminum bronze, head lamp mounting height and battery tray terminals, were adopted as proposed.

The standards covering ⅜, 7/16 and ½ inch compression fittings were referred back to the divisional committee for further consideration, the ⅛, 3/16, ¼ and 5/16 in. sizes being approved as proposed. In the door hinge standard it was voted that the screw holes should be counter sunk to conform with the American standard as to diameter and angle.

It also was decided that the standard list of tap drill sizes be expanded to include sizes up to 1½ in., and that a reference table of drill sizes for minor diameters of the extra fine screw thread series be prepared.

Ford 1924 Output Placed at 1,810,000

Retail Sales of Cars and Trucks Showed a Gain Over 1923 of 87,736

DETROIT, Jan. 21—Retail sales of Ford cars and trucks in the United States for 1924 totaled 1,873,581, an increase of 87,736 over the sales for 1923. The sales record of Ford trucks went over the 200,000-mark for the first time during any one year, exceeding those of the former year by 15,013.

The retail figures for the year, in addition to showing a gain over the sales figures of the year before, also represent a figure approximately 70,000 in excess of the production total for the year. This is accounted for by the fact that production was very high in the latter months of 1923 and dealers carried many of these cars into the early months of 1924.

The production figure for the last year approximates 1,810,000.

Retail sales of Lincoln cars showed an increase of approximately 25 per cent over the 1923 figure, the totals being 7501 and 6018, respectively.

8 Companies Lose Car Distribution Appeal

WASHINGTON, Jan. 20—The Ford Motor Co. was one of eight companies which lost their appeals for the continuance of the practice of railroads in assigning private cars and foreign-line cars for railway fuel to bituminous coal mines in excess of the ratable share contemporaneously distributed to bituminous coal mines upon their lines, which do not receive assigned cars.

The Interstate Commerce Commission reaffirmed its previous decision, declaring the practice unjust and unreasonable and ordered the railroads to change their practice with regard to privately owned coal cars by March 1, 1925.

Commissioner Cox said no question which has come before the commission in recent years is more closely related to the industrial life of the nation than this case which deals with the distribution of coal cars.

The other companies affected are the Bethlehem Steel Corp., the United States Steel Corp. and its subsidiaries, the Pittsburgh Plate Glass Co., Youngstown Sheet and Tube Co., Wisconsin Steel, International Harvester Co. and the Steel Co. of Canada.

REYNOLDS EARNS $688,078

JACKSON, MICH., Jan. 21—Reynolds Spring Co. and its subsidiary, the General Leather Co., in the consolidated income account for 1924 show net earnings of $688,078, as against $391,254 in 1923. After reserves for depreciation, taxes and other deductions, net income is shown as $469,585, as compared with $290,234 the previous year. After allowing for preferred dividends, the net income for 1924 was equal to $1.13 a share earned on the 387,958 shares of no par value common stock, against $1,57 a share earned on 177,010 shares in 1923.

Gardner Brings Out New 6-Cylinder Line

ST. LOUIS, Jan. 21—Gardner is bringing out a new six-cylinder line which will be first shown at the Chicago show. This is the second new Gardner to be brought out since the first of the year, the other being the Gardner Eight-In-Line. The engine is of the L-head type, 3⅛ in. bore and 4½ in. stroke, giving a piston displacement of 207 cu. in. The actual horsepower is 57 on the brake. The pistons are light weight gray iron and the water pump, generator and camshaft are driven by a self adjusting chain. The cylinder heads are removable and a Swan manifold is used.

Lubrication is full force feed through a gear driven pump and the pressure is controlled by the opening and closing of the throttle, rather than by the speed of the engine. A pressure gage is on the dash and Alemite lubrication is used for the chassis points.

The gasoline feed is by vacuum from the tank at the rear. The electrical system includes a Remy two-unit starting, lighting and ignition outfit and a Prest-O-Lite battery.

The bodies, which include a five passenger special touring, five passenger brougham and five passenger touring, are long and low hung and the wheelbase is 118 in. The finish is in rich two tone combinations of Duco. Balloon tires 30 x 5.25 in. are fitted, as are also inclosed type four wheel brakes.

Yellow Makes New Type of Coaches for Detroit

CHICAGO, Jan. 21—Increased passenger capacity in the coaches being made for Detroit has caused the production of a new design by the Yellow Coach Manufacturing Co., this being known as Model YZ. The increase in wheelbase length to 230 in. called for a new frame in which there is seen a departure from previous coach practice, the side rails extending to the rear so as to include the rear platform support, which on other designs has been a separate unit, attached to the main frame.

In spite of the increase in length the turning radius has been held to a short distance by the use of a wide tread at the front axle, which permits the front wheels to turn through a very wide angle. This turning angle also has been made possible by the use of a special type of Ross cam type steering gear on which the pitman arm turns through an angle of 90 degrees.

The power plant includes the big six-cylinder sleeve valve engine used in the Model Y chassis, except that the transmission on the Model Y is mounted amidships as on Model Z, instead of being a unit with the engine as on Model Y.

Motor Registrations Gain in Canada

Total Dec. 31, 1924, Was 636,489, an Increase of 70,003 Over 1923

OTTAWA, CANADA, Jan. 21—Canadian motor vehicle registrations totaled 636,489 on Dec. 31, 1924, an increase of 70,003 over Dec. 31, 1923, according to the latest figures available. Complete figures are not available as regards one or two provinces, but the final totals will not differ materially from those given below:

1924	Passenger Cars	Trucks	Motorcycles
Ontario	271,441	31,617	3,940
Quebec	69,747	11,236	1,999
Saskatchewan	55,928	3,780	187
British Columbia	42,000	8,400	800
Alberta	45,871	2,053	331
Manitoba	39,500	2,500	550
Nova Scotia	18,222	2,235	137
New Brunswick	18,012	1,393	153
Prince Edward Island	2,454	100	7
	573,175	63,314	8,104

1923	Passenger Cars	Trucks
Ontario	245,815	28,612
Quebec	59,998	8,961
Saskatchewan	60,931	2,086
British Columbia	33,500	6,000
Alberta	39,742	2,191
Manitoba	39,087	2,428
Nova Scotia	16,104	1,999
New Brunswick	15,409	1,193
Prince Edward Island	2,331	99
	512,917	53,569

Registrations in Newfoundland have reached a total of 750 cars and 120 trucks. There are 150 motorcycles in Newfoundland.

Selden Develops New Light Speed Truck

ROCHESTER, N. Y., Jan. 20—The Selden Truck Corp. of this city has developed a new 2¼ ton light speed truck which will be placed on the market about Feb. 15. The trucks will be offered in two wheelbases, a standard wheelbase of 154 in. and a special wheelbase of 180 in. The price of the standard will be $2,975 with $75 additional charge for the special.

Except for the difference in size, the new truck is an exact replica of the Selden Pacemaker, a 1¼ ton light speed truck put on the market about a year ago. The new truck is powered by a 3¾ in. bore, six-cylinder Continental engine developing 70 hp. and designed to run consistently at a speed of from 30 to 35 m.p.h. without noticeable engine vibration. It has a maximum speed of 45 m.p.h. with a capacity load.

Other features of the truck are heavy duty spiral bevel gear drive, steel wheels, pneumatic tires front and rear and electric starting and lighting systems. The standard wheelbase provides a loading space of 10 ft. behind the driver's seat, and the special a 14 ft. loading space. The special is rated at 2½ tons.

Milwaukee Operating Schedules Advanced

Sales Are Reported on Increase, While Competition Is Keen

MILWAUKEE, WIS., Jan. 19—Operating schedules of automotive parts and equipment producers in this district are steadily advancing in line with improved shipping directions on contracts with manufacturers to meet their increasing output schedules, while orders from the wholesale and jobbing trade likewise are growing, both for prompt and early spring delivery.

At the middle of the month more men were being employed than at any similar date since August, and by the end of January it is believed a new peak for 12 months will be reached.

Passenger car sales are on the upgrade, and excellent results are expected to accrue from the 17th annual Milwaukee show, Jan. 17-24 in the Auditorium. Deliveries have been particularly improved since Jan. 1, a large number of the buyers having deferred delivery on December orders to avoid paying a heavy license fee to the State for a week or two, Wisconsin licenses being annual and on a weight basis.

Weather conditions have been more favorable in January than in December, a month that was unusually severe in cold and snow.

Outside of Ford, the keenest competition is among Nash, Hudson-Essex and Buick. The Nash Sales Co. in December led all makes except Ford, maintaining a similar position over a four-month period, September-December, in Milwaukee County sales.

On a State-wide basis, Nash was third to Ford and Chevrolet in the same period. In Milwaukee County, for December, official figures show the following order: Ford, Nash, Buick, Hudson, Essex, Chevrolet, Dodge, Overland and Studebaker.

Hudson-Essex, in combination, ranked second in Milwaukee County in December. Combining sales is considered justifiable for comparisons with makes of a single name offering a light and large six.

Official figures show Hudson-Essex sales together were seven ahead of Nash, 12 ahead of Buick, 19 ahead of Dodge, 21 ahead of Overland and 23 ahead of Studebaker.

Engine Maker May Enter Automotive Field

MADISON, WIS., Jan. 20—The Fuller & Johnson Co. of this city, pioneer manufacturer of farm engines, has placed in production a number of new types, including two, three and four-cylinder models, besides refining its original line of single-cylinder motors for the 1925 market.

While it is believed that the intention is not to invade the automotive field as it relates to passenger cars and trucks, nevertheless the trend is said to be in that direction. The new multiple-cylinder types are designed for use in the construction field and are adapted to the operation of concrete mixers, conveyors, hoists, pumps, electric generating systems and other machinery requiring compact, direct connected power units.

The single cylinder engine is used in connection with feed grinders, pumps, milking machines, saw rigs and other agricultural machinery in nearly every civilized country on the globe.

The Fuller & Johnson company has been engaged in making farm equipment for 85 years.

Mack Trucks in 1925 to Double 1924 Output

NEW YORK, Jan. 19—Production and sale of Mack buses during the current year will be more than double the record made in 1924, according to R. A. Hauer, manager of the bus department of Mack Trucks, Inc.

Mack factories are operating at full capacity and plans are now under way for extensive expansion of manufacturing facilities to meet the rapidly growing demand, stated Mr. Hauer.

"Sales so far this year have given conclusive evidence," he said, "that we are entering an era of great prosperity and progress. Our passenger-carrying bus production has increased 340 per cent in the past two years. Railroads and electric traction companies absorbed 65 per cent of our bus output in 1924. The use of motor buses by railroads in the past two years has increased from about 700 operated by 30 or 40 companies to close to 5000 among the 200 or more steam and street lines in the country."

Mr. Hauer estimated that 5400 buses, representing an approximate cost of $30,000,000, have been purchased since the first of 1924 and that 1500 new bus lines have begun operation in this period.

$7,000,000 Spent in 1924 on Lincoln Highway

DETROIT, Jan. 21—With the advent of 1925 the Lincoln Highway Association enters upon its 12th year of promotional activity. Its directors soon will gather in Detroit or New York upon call of President J. Newton Gunn to consider plans for 1925 and to review the progress in the development of the highway recorded in 1924.

The headquarters of the association still lacks detailed figures as to construction accomplished in many of the States and counties between New York and San Francisco last year, but incomplete figures indicate that considerably over $7,000,000 was invested in permanent betterment of the route and in maintenance along its 3100 miles between the Hudson River and San Francisco Bay in 1924.

Ohio Clubs Prepare for New Legislation

Numerous Measures Relating to Automotive Industry Prepared for Session

COLUMBUS, OHIO, Jan. 21—Automobile clubs of Ohio are girding themselves for the most strenuous legislative battle in their history, with the prospect that the record of the 85th general assembly two years ago, when 88 bills were introduced, will be surpassed this year. In making the forecast, Secretary Charles C. Janes of the Ohio State Automobile Association declared that Ohio motorists were better organized than ever before and would present to the Legislature a united front on all the major automobile items.

Mr. Janes listed as important measures that are certain to come up the gasoline tax, reduction of license fee, changes in the present system of distributing license tags, amendments to the bill of sales law, requirement that an application for license plates be accompanied by an affidavit, changes in the Freeman-Collister law regulating buses, restoration of the half mill road levy to raise $5,000,000 a year, curtailment of the authority and jurisdiction of the justices of the peace, the uniforming of all traffic officers, State highway patrol, drivers' license law and a number of measures relating to State Highway Director Boulay's request that the State finance a $24,000,000 a year road program for two years.

"In addition to these," Mr. Janes said, "there undoubtedly will be the usual flood of bills purporting to be safety measures, but which will in reality merely require the motorist to buy new patent equipment or subject him to further taxation and regulation."

While the new Legislature is organizing itself, the O. S. A. A. legislative committee is sounding the motorists of the State on these questions and getting ready to submit specific recommendations when the Legislature meets.

Senator J. F. Atwood, of Columbus, chairman of the committee, is supported in this work by C. H. Bryson of Athens, A. E. Mittendorf of Cincinnati, W. S. Thurstin, Jr., of Toledo, W. A. Stinchcomb of Cleveland and Secretary Charles C. Janes of Columbus.

Milwaukee Merchants to Issue Parking Slips

MILWAUKEE, Jan. 21—As a temporary solution, at least, of the vexatious parking problem of customers of Milwaukee department stores, the Grand Avenue Business Men's Association expects to put into effect on Feb. 1 a plan whereby members will give their patrons slips good for parking cars for one and a half to two hours in any of the downtown parking places or storage garages.

Detroit Show Proves Mainly Body Exhibit

Attendance Is Large and Merchandising Facilities Are Highly Developed

DETROIT, Jan. 21—Heavy attendance at the Detroit automobile show, which opened Saturday night, continued through the week and is expected to lead to a large volume of show sales. Preparations by the Detroit Automobile Dealers Association have been toward developing to the utmost the merchandising possibilities of the show, and it is expected to make it one of the most successful in the long series held here.

The setting for the show is in spring colors in which the bright body finishes of the cars appear especially attractive. It is in a large sense a body show, the appeal of the cars being mainly in the comfort of appointments and the exterior lines and finishes. There is a scattering of open models, mostly in sport colors, and an occasional chassis. The truck show is especially good, the majority of the exhibits being in special commercial body styles and bearing the names of the business houses for whom they were designed and who bought them.

It is notable that the attractiveness of the show exhibit is due to the dealers getting away from plain chassis exhibits and displaying special body types. There are five motorboat displays, and the accessory exhibits make up about one-quarter of the show.

The show is being held for the third year in Convention Hall. Every day during the week has been designated for special attendance, the Society of Automotive Engineers and the Michigan Automotive Trade Association holding annual meetings during the week and planning to attend the show.

Previous to the show opening, a meeting for dealers and salesmen was staged by the Detroit Dealers Association and the Detroit Retail Sales Managers Association, at which W. B. Burruss, Kansas City, gave a specialized selling talk to put everyone on edge for show effort.

Accessories Feature Show at Newark, N. J.

NEWARK, N. J., Jan. 20—Thirty-seven different makes of cars and one motorcycle were exhibited at Newark's 18th annual automobile show, which opened Jan. 10 in the 115th Infantry Armory and continued through the following week. Despite the inclement weather, large crowds visited the exhibit, which Claude E. Holgate, show manager, pronounced a decided success.

Lining the balcony, the accessory booths attracted much attention in spite of the poor access and inadequate promenade. Although the majority of the accessory exhibitors were local merchants, there was a good representation of manufacturers, some of whom were from points as far distant as the Middle West.

An innovation on the balcony was the accessory booth of the Uppercu-Cadillac Co. of Newark. It is the first time an automobile dealer contracted for space in the accessory department.

M. A. M. A. Committees Announced for 1925

NEW YORK, Jan. 20—Committee appointments of the Motor and Accessory Manufacturers Association have been made by President E. P. Chalfant for 1925 as follows:

Executive—E. P. Chalfant, chairman, Gill Manufacturing Co.; C. Brewer Griffin, Westinghouse Electric & Manfacturing Co.; C. E. Thompson, Steel Products Co.; A. H. D. Altree, American Bosch Magneto Corp., and W. O. Rutherford, B. F. Goodrich Co.

Finance and Expansion—E. P. Chaffant, chairman, Gill Manufacturing Co.; L. M. Wainwright, Diamond Chain & Manufacturing Co.; C. Brewer Griffin, Westinghouse Electric & Manufacturing Co.; H. W. Chapin, Brown-Lipe-Chapin Co.; C. H. L. Flintermann, Michigan Steel Casting Co., and J. M. McComb, Crucible Steel Casting Co. of America.

Show and Allotment—C. E. Thompson, chairman, Steel Products Co.; Eugene B. Clark, Clark Equqipment Co., and H. L. Horning, Waukesha Motor Co.

Membership—A. H. D. Altree, chairman, American Bosch Magneto Corp.; M. B. Ericson, Biflex Products Co.; C. H. L. Flintermann, Michigan Steel Casting Co., and Eugene B. Clark, Clark Equipment Co.

Banquet—Eugene B. Clark, chairman, Clark Equipment Co.; M. B. Ericson, Biflex Products Co., and C. H. L. Flintermann, Michigan Steel Casting Co.

Association Relations—H. L. Horning, chairman, Waukesha Motor Co.; G. Brewer Griffin, Westinghouse Electric & Manufacturing Co., and M. L. Heminway, Motor and Accessory Manufacturers Association.

Thermoid Discontinues Tire Manufacturing

TRENTON, N. J., Jan. 20—Announcement is made by the Thermoid Rubber Co. that it has discontinued the manufacture of automobile tires and tubes and hereafter will devote the plant solely to the manufacture of mechanical goods. The company had been making tires and tubes for many years, and its product was sold in every section of the United States, as well as in foreign lands. Recently it added several additional asbestos lines to its products and decided to manufacture the Stokes asbestos brake lining, belting, packing and moulded hose.

Officials of the company said the discontinuance of the tire line in no way would affect the agencies. These will be continued for the distribution of automobile brake lining and other mechanical goods.

Many Make Purchases at Cincinnati Show

Percentage of Buyers Reported Larger Than at Any Previous Exhibit

CINCINNATI, Jan. 21—There were 32 exhibits at the Cincinnati annual automobile show, which began Jan. 10 and lasted through the following week. It was sponsored by the Cincinnati Automobile Dealers Association, of which J. W. Tarbell is president and Harry T. Gardner is secretary. There was a large attendance each day, and the percentage of buyers and actual prospects was larger than ever before noted at an automobile show here.

Half of the exhibits were in the north wing of Music Hall and the other half in the south wing. More than 250 cars were shown, these being different models of the following 37 makes:

Pierce-Arrow, Maxwell, Chrysler, Chandler, Reo, Page, Oldsmobile, Jewett, Studebaker, Hupmobile, Cleveland, Willys-Knight, Overland, Hudson, Essex, Franklin, Moon, Nash, Rollin, Chevrolet, Oakland, Dodge, Lincoln, Ford, Stutz, Buick, Star, Durant, Cadillac, Rickenbacker, Peerless, Flint, Jordan, Packard, Marmon, Sterling-Knight and Wills Ste. Claire.

In keeping with the bright colors on many of the new cars exhibited, both halls had an azure overhead, with suitable landscapes on the walls. One hall contained rows of large orange trees, with real oranges on the branches, while the other room had rows of apple trees, all filled with blossoms. In all of these trees were concealed canaries, which furnished ample music.

The brighter colors of the cars and the general changes in outward appearance furnished the chief topic of conservation of those who attended. Buyers and prospective buyers were much pleased to find that there is a greater tendency to install needed equipment at the factory, thus making it unnecessary to bother with extras when a new car is purchased.

During the show there were incidental features to divert the minds of visitors. Those who wanted to rest could go into the auditorium of Music Hall, which is between the two exhibit wings, and listen to the orchestra, or to the radio. WLW had a broadcasting station at the show, and one of the features of this was a radio wedding. Broadcasting was done day and night. This, it is stated, caused many persons living at a distance to attend the show.

BUS CENTRAL PLANNED

WASHINGTON, Jan. 21—A central station for this city's various motor bus lines and those operating in neighboring States is under consideration here by Maj. W. E. R. Covell, assistant to the Public Utilities Commission. He points out that both the public and the bus lines would probably benefit.

Move Made to Steady the Retail Market

Leading Automobile Maker Takes Steps to Counteract Price Changes

DETROIT, Jan. 21—To counteract the effect of price reductions on the general automobile retail market and to remove them as far as possible as an important factor in making sales one of the most important companies in the industry is undertaking a major dealer educational movement which will extend over a period of several yeras. The purpose of this is to create a steady, continuing sales effort which will not be affected by temporary sales strategems such as price reductions or new models.

Details of the movement will not be disclosed generally, according to the plans of the company, but will be extended to its dealer organization by personal educational effort. Field representatives of the company and special educational men will be employed to carry the details of the plan to dealers. These details of the general working plan will be released to dealers piecemeal, time being given for absorption and employment of each step before the next is advanced.

As an idea of the extent of the plan, it is authoritatively learned that $1,250,000 has been appropriated for carrying through this merchandising development over the next two years. With the plan in effect it is declared by its sponsors that this company will overcome lulls in its market from any ordinary cause, doing this by educating delaers to the point of maintaining steady effort on sound selling principles. Price reductions will be made by this company, according to its plan, only when the metal markets justify them. Reductions by other manufacturers will be disregarded.

The plan is understood to provide for handling used cars on a basis that eliminates much of the difficulty that has been encountered thus far.

MEETINGS, LUNCHEONS AND DINNERS SCHEDULED TO BE HELD DURING CHICAGO SHOW

Following is a list of conventions, banquets and luncheons of an automotive nature scheduled to be held in Chicago during the week of the 25th National Automobile Show:

Thursday, January 22

Salesmen's Banquet, Chicago Automobile Trade Ass'n, Congress Hotel, 6:30 p.m.

Friday, January 23

National Automobile Show, opened to the trade only, Coliseum, 10 a.m.
Paige-Detroit Motor Car Co. Sales Convention, Blackstone, Friday and Saturday.
Dodge Brothers Sales Convention, Auditorium Hotel, all week.

Saturday, January 24

Twentieth Annual Automobile Salon, opens 10 a.m. at the Drake Hotel and continues to January 31.
Paige-Detroit Sales Convention, Blackstone Hotel.
Annual Paige Banquet, Blackstone, 7 p.m.

Monday, January 26

Eighth Annual Convention, National Automobile Dealers Ass'n, LaSalle Hotel, 10 a.m.
Hupp Motor Car Co. Dealers' Banquet, Blackstone, 6:30 p.m.
Meeting of Board of Governors, Automotive Electric Service Ass'n, Congress Hotel.

Tuesday, January 27

N.A.D.A. Convention, LaSalle Hotel, 10 a.m.
Convention, Automotive Electric Service Association, Congress Hotel.
N.A.D.A. Convention, LaSalle Hotel, 6:30 p.m.
Briggs and Stratton Corp., Dinner, Congress Hotel, Evening.

Wednesday, January 28

N.A.D.A. Convention, LaSalle Hotel, 10 a.m.
Packard Motor Car Co., Luncheon, Drake Hotel.
Oakland Motor Car Co., Luncheon, Blackstone Hotel.
Oldsmobile Dealers' Dinner, LaSalle Hotel, 6:30 p.m.
Old Timers' Banquet, Congress Hotel, 7 p.m.

Thursday, January 29

Studebaker Dealers' Banquet, Blackstone Hotel, 7 p.m.
Nash Dealers' Luncheon, Lexington Hotel, 12:30 p.m.

Willys Sold More Cars Than He Built in 1924

TOLEDO, Jan. 20—Stockholders of the Willys-Overland Co., Inc., have been informed by John N. Willys, president, that the ratio of current assets to current liabilities are seven to one. When the annual report is made known, Mr. Willys pointed out, it will be one of the best in the history of the concern.

In his communication to the stockholders Mr. Willys declared that during the past year the company retired $1,000,000 in bonds and left $9,000,000 in bonds outstanding.

"We sold 12,000 more cars in 1924 from our own stock than we built," he said. "Our dealers sold many more cars in 1924 than they purchased. The result is that our dealers' stocks, as well as our own, are below normal. The major portion of our business last year was done on the low-priced Overland line. I believe that 50 per cent of our business for 1925 will be done on the six-cylinder Overlands and the four and six-cylinder Willys-Knights, on which we have had a very satisfactory profit."

Canadian Ford Shipments Increase in December

DETROIT, Jan. 21—During December, 1924, Ford Motor Co. of Canada, Ltd., shipped 4711 cars and trucks, as compared with 3403 in November and 5476 in December, 1923. In December domestic shipments declined 30 per cent from the previous month, while exports increased 70 per cent and constituted nearly 85 per cent of December shipments.

For the first five months of the current fiscal year shipments of cars and trucks totaled 21,009, of which about 60 per cent constituted exports, against 27,133 the previous year.

During the calendar year 1924 Ford of Canada shipped 71,726 cars and trucks, of which 37,822 were domestic and 33,904 foreign, compared with 79,115 cars and trucks in 1923, comprising 41,762 domestic and 37,353 foreign.

RECEIVER FOR FREMONT

FREMONT, OHIO, Jan. 20—The Fremont Motors Corp. has been placed in receivership upon the application of three creditors.

New Jersey Is Offered 46 Buicks for $42,995

TRENTON, N. J., Jan. 21—The State purchasing department on Jan. 15 received bids for supplying 46 Buick automobiles for the State police, motor vehicle and highway departments. The low bid was offered by the American Auto Co. of New Brunswick, N. J., whose figures were $42,995. The high bid was the Somerset Buick Co. of Somerville, N. J., whose offer was $45,983.

The list price of the automobiles is $75,995, but the reductions were offered because a like number of vehicles will be traded in for the new cars. The allowance amounts to about $877 per car. If it is found that a more favorable figure can be obtained the present bids will be rejected. The new cars will be used by the State for the present year.

Seeks Treaties to Stop Foreign Discrimination

WASHINGTON, Jan. 21—John N. Willys, chairman of the Foreign Trade Committee of the National Automobile Chamber of Commerce, has presented to the Senate Committee on Foreign Relations an application for new commercial treaties to discourage discrimination against American automobiles abroad.

The application particularly calls for treaties which will tend toward an equilibrium of trade in manufactured products.

Goodyear to Reopen Marathon Tire Plant

Factory, Closed Since July, to Start Feb. 15 with 500 Men Employed

AKRON, Jan. 21—The plant of the Marathon Tire & Rubber Co., closed since last July, will be reopened Feb. 15, under management of the Goodyear Tire & Rubber Co., it was announced here by C. E. Baylor, superintendent.

Approximately 500 men will be employed. They will work on three eight-hour shifts. It is planned to enlarge this force later, according to officials.

Tire production tickets call for 1000 automobile casings a day. No tubes will be manufactured, it is stated. Other products will include belts, golf bags, traveling bags and other leather articles.

The Marathon company went into receivership last February, when bank loans were called. Total indebtedness was approximately $400,000. Operations under the receiver were unprofitable, and the plant was closed down in the summer. Goodyear has purchased both the plant, the Marathon trade marks and patents from the trustee in bankruptcy.

Goodrich Financial Position Improves

There is considerable speculation in rubber circles here as to what action, if any, will be taken by directors of the B. F. Goodrich Co. on common dividends at the regular quarterly meeting Jan. 28.

It is freely predicted that Goodrich will pay common dividends before summer. The company earned last year between $8 and $9 net on the common stock, after paying fixed charges and dividends on the preferred stock, it is said.

With indications of a better business this year, rubber men say Goodrich should earn close to $12 a share on common stock. Recent buying, which boosted the stock this week to 45½, more than double what it was selling for last summer, is said by local brokers to be in anticipation of early dividend resumption.

The company has a bank indebtedness of approximately $8,000,000, which it is proposed to materially reduce this year.

Tire Demand Gains

AKRON, Jan. 21—Statistics compiled by William F. Pfeiffer, general manager of the Miller Rubber Co., show that between 1921 and 1924, inclusive, tire replacements were at the almost constant rate of 2.74 tires per car per year, as compared to 4.53 tires per car in 1916.

Improvements in tire manufacture have been mainly responsible for placing tire replacements at this low level, according to Mr. Pfeiffer.

H. E. STOWELL DEAD

SYRACUSE, N. Y., Jan. 20—Harry E. Stowell, president of the Stowell Motor Car Co. of this city and one of the best known automobile dealers in central New York, died here following a long illness of typhoid fever.

He was one of the directors of the Syracuse Automobile Dealers Association and active in many other organizations. He was 41 years old.

Kokomo Rubber Produces Addition to Tire Line

KOKOMO, IND., Jan. 20—The Kokomo Rubber Co. is making extensive changes in factory equipment and installing new machinery. According to Randolph Mitchell, general manager, the work will be finished in time to make use of the new and improved facilities for spring production.

The company is in production on an addition to its tire line, known as the "Black Gold Cord," which replaces the "Twin Grip Fabric."

The new tire incorporates the "side-wall bumper" feature of the Kokomo balloon cord and the Kokomo heavy duty cord.

Air Cleaner Plant Offered for Sale

CHICAGO, Jan. 21—H. L. Mills and Fred E. Hummel have asked for bids for the assets of the United Manufacturing & Distributing Co., Chicago, known to the automotive industry for its production of the United Air Cleaner. The company has also been an active producer of other supplies, including radio sets and equipment. In addition to offering a variety of finished stocks and raw materials for manufacture of such stocks, the receivers ask bids on machinery and plant equipment, including tools, jigs and dies, office furniture and receivables.

The company's air cleaner is used as standard equipment on many makes of cars. The machinery and equipment were appraised Jan. 1 at $147,690. Raw material, material in process of manufacture and finished goods were valued at $75,995.23; tools, jigs and dies at $134,402.36; notes and bills receivable, $145,945.49.

Bids will be received by Receivers H. L. Mills and Fred E. Hummel, the former at 9705 Cottage Grove Ave. and the latter at 53 W. Jackson Boulevard, until Jan. 31, and they will be reported into court for approval Feb. 2. The business is being operated by the receivers in such a manner that a purchaser can take over the property and the company organization intact.

U. S. Tractor Plant Sold to Miller Company

MENASHA, WIS., Jan. 19—The machinery in the plant of the U. S. Tractor & Machinery Co., Menasha, Wis., formerly manufacturing the Uncle Sam tractor, has been purchased by the Miller Paper & Iron Co. of the same city and is to be placed on the used machinery market.

U. S. Places Value on Motor Vehicles

Bureau Estimates All in Country Jan. 1, 1923, at $4,567,407,000

WASHINGTON, Jan. 21—The wealth of the United States at the beginning of January, 1923, according to revised figures of the census bureau, has been placed at $320,803,862,000. Of this sum $4,567,407,000 was represented by motor vehicles. The total wealth of the country represents an increase of 72.2 per cent during the last decade, the wealth at the beginning of 1913 being placed at $186,299,664,000.

The 1923 estimate of the value of motor vehicles in use was the first classification made of this sort of wealth. Consequently there is no basis for a comparison with the 1913 census.

The estimated value of motor vehicles is based on the reported production during a period of years covering the average life of automobiles, trucks and motorcycles with statistics of revised registrations prepared by the bureau of public roads and other agencies containing allowances for depreciation, and the value in accordance with prices prevailing in 1922.

Average Car Life Seven Years

In making the computation the average life in use of the passenger car was assumed to be seven years and that of trucks was assumed to be six years. On this basis cars that went into service in 1916 and trucks that went into service in 1917 were regarded as out of use at the close of 1922, the former having lost one-seventh and the latter one-sixth of their value each year.

Applying these proportions to the number of cars going into service in the United States each year it was found that the numbers available for use on Jan. 1, 1923, were equivalent to 5,070,974 new cars and 556,698 new trucks.

Based on information furnished by the automobile manufacturers at the beginning of 1923 an average price of $770 was adopted for passenger cars and $1,050 for trucks. Cars manufactured in 1915 and trucks manufactured in 1916 were given a used value of $25 and $50 respectively.

As computed in accordance with this method the value of passenger cars, according to the revised figures of the department, is estimated at $3,942,026,000, and the value of trucks was estimated at $592,317,000.

By similar methods the values of trailers and motorcycles were estimated at $8,945,000 and $24,119,000 respectively, completing the total estimate of $4,567,407,000 for motor vehicles.

NEW ROLLIN TRUCK

CLEVELAND, Jan. 20—Rollin Motor Co. has brought out a new one-ton truck equipped with four-wheel brakes.

A. A. A. Moves Against Automobile Thieves

With 42 Legislatures in Session, a Nation-wide Drive Is to Be Launched

WASHINGTON, D. C., Jan. 19—A nation-wide campaign against the automobile thief will soon be launched by the American Automobile Association, it has just been announced. In this drive the association will endeavor to secure the adoption of a universal State certificate of title law for automobiles.

Pointing out that the practice of automobile thievery cannot be brought under control unless a national effort is made, officials of the A. A. A. have declared in their attempt to make the national campaign a success they will strive to obtain action in the State legislatures. A complete end to automobile thievery cannot be brought about, they declare, unless all of the States cooperate in the national drive, and this cannot be accomplished unless the individual legislatures sanction the movement of the association.

Of the 48 State legislatures throughout the country, 42 will be in session this year. The campaign of the A. A. A. will be placed before these for action.

Twelve States which have already adopted the legislation sponsored by the A. A. A., will cooperate in furthering the fight against the automobile thief by opening their records for inspection to show the successful efforts made in their territory against the thief. In comparatively all of the 12 States which have adopted the enactment of the certificate of title law, the number of cars previously stolen has been cut in half since the movement was sanctioned.

Two Report Reductions

Maryland and Michigan officials, for instance, have reported a 50 per cent reduction in theft losses, while the recovery of stolen cars in these two States has been 95 per cent since the passage of the law.

In commenting on the urgency of action by those States that have not yet enacted a certificate of title law, Roy Britton, chairman of the legislative board of the American Automobile Association, said:

> Professional automobile thieves are able to carry on their practice with impunity because in most of the States it is unnecessary to prove or register title when a car is bought or sold. The passage of a uniform certificate of title law in all of the States will ultimately destroy the market for stolen automobiles and reduce the cost of automobile theft insurance.
>
> In twenty-eight key cities of the country, 200,000 automobiles were stolen in the last six years, of which only 25 per cent were recovered. A conservative estimate places the value of stolen motor vehicles at $100,000 a year.

The law sponsored by the A. A. A. has four main provisions as follows:

> First, compulsory issuance of certificates of title and evidence of registration.
>
> Second, regulation of purchase and sale or other transfer of ownership in a motor vehicle.
>
> Third, regulation and licensing of certain dealers in used and second-hand cars.
>
> Fourth, provisions to facilitate recovery and restoration to the owner of motor vehicles stolen or unlawfully taken.

London Metal Institute Elects Many Americans

LONDON, Jan. 12 (*by mail*)—The following Americans have been elected members of the Institute of Metals here:

William Hastings Bassett, Jr., technical supervisor The American Brass Co.; Frederick S. Chase, president Chase Companies, Inc.; Launcelot A. Danse, metallurgist, Cadillac Motor Car Co.; Carl F. Dietz, president and general manager Bridgeport Brass Co.; Edgar Hutton Dix, Jr., metallurgist research bureau, Aluminum Co. of America; James Francis Donnelly, metallurgist, A. Schrader's Son, Inc.; Herman L. Greene, chief metallurgist Willys-Overland Co.; Charles Ruffin Hook, vice-president and general manager American Rolling Mill Co.; Daniel H. Meloche, metallurgist Holley Carburetor Co.; Fritz Nicholas Meyer, technical supervisor Waterbury branch American Brass Co.; Harold Harmond Richardson, metallurgist Aluminum Co. of America; Anthony J. Smith; assistant metallurgist Packard Motor Car Co.; Frank Newman Speller, metallurgist engineer National Tube Co., and Ewart Stanley Taylerson, metallurgical engineer American Sheet and Tin Plate Co.

Motor Wheel Corp. Opens New York Export Office

DETROIT, Jan. 19—The Motor Wheel Corp. has opened an export office in New York City under the direction of C. O. Brandes, who for the last seven years has handled the export department of the Firestone Tire & Rubber Co.

Under the guidance of Mr. Brandes Motor Wheel is planning extensive development of export markets, in which it feels there is a large potential business, which up until this time it has been unable to seek.

Extension of the company's efforts to the export field follows extensive development of replacement business in the United States. In the last two years the company has named 71 distributors of its wheels and service parts throughout the United States.

By April 1 the company plans to have a distributor warehouse and service for repairing and servicing wheels in every city with a population in excess of 25,000.

ROAD SCHOOL HELD

LAFAYETTE, IND., Jan. 19—The eleventh annual road school was held in this city under the direction of the School of Civil Engineering. It was a part of the engineering extension service of Purdue University. Among the speakers was Pyke Johnson of the National Automobile Chamber of Commerce, who spoke on "Highway Policies."

French Plan Change to Specific Duties

Proposed Tariff Act Would Abolish Present Ad Valorem Automobile Rates

PARIS, Jan. 12 (*by mail*)—In the revision of the French tariff, which forms a part of the proposed law of Nov. 21, 1924, the present ad valorem duty on automobiles will be replaced by specific duties based on weight per 100 kilograms, there being in each case a general and a minimum tariff. For completely equipped automobiles the rates are as follows:

	General frs.	Minimum frs.
750 kilos and less	1,800	600
750 to 870 kilos	1,980	660
870 to 990 kilos	2,160	720
990 to 1100 kilos	2,340	780
1100 to 1230 kilos	2,520	840
1230 to 1350 kilos	2,700	900
1350 to 1470 kilos	2,880	960
1470 to 1590 kilos	3,060	1,020
1590 to 1710 kilos	3,240	1,080
1710 to 1830 kilos	3,420	1,140
More than 1830 kilos	3,600	1,200

For chassis only, intended to be equipped with passenger carrying bodies, the rates are as follows:

	General frs.	Minimum frs.
600 kilos and less	1,800	600
600 to 700 kilos	2,160	720
700 to 800 kilos	2,160	720
800 to 900 kilos	2,340	780
900 to 1000 kilos	2,520	840
1000 to 1100 kilos	2,700	900
1100 to 1200 kilos	2,880	960
1200 to 1300 kilos	3,060	1,020
1300 to 1400 kilos	3,240	1,080
1400 to 1500 kilos	3,420	1,140
More than 1500 kilos	3,600	1,200

For trucks and tractors the proposed rates are 1980 francs under the general tariff and 660 francs per 100 kilograms minimum tariff. The rates for various units entering into the construction of automobiles are variable. For engine, clutches, transmissions, rear axles, front axles, steering gear, levers, pedals, rods, steel, copper and bronze pipes, etc., the rates are 3600 general and 1200 francs minimum tariff per 100 kilos.

For small parts, comprising bronze and aluminum gear wheels, connecting rods, pistons, bearings, valves, valve guides, push rods and all other parts having a unit weight of less than 500 grams, the rates are 7200 and 2400 francs per 100 kilograms.

The general impression in France is that this law, which has not yet come up for discussion, will be voted during 1925 and will not go into effect until 1926. Under this law the type of car having the biggest sale on the French market, namely the small two-seater weighing inside 1900 lb., and the four-passenger car weighing about 2400 lb., would pay, respectively, $360 and $477 import duty at present rates of exchange.

A Dodge roadster listed at $855 would cost $1,332 delivered in France, and the price of a Durant touring would be $1,307. This shows very little, if any, decrease on the present duties on the basis of 45 per cent, plus 20 per cent, plus transportation charges.

No Engine Finishes Airplane Contest

After 10 Months French Prize of 2,000,000 Francs Remains Unawarded

PARIS, Jan. 12 (*by mail*)—After a period of ten months not a single engine has completed its tests in the international 240-hour trials for commercial airplane engines, for which the French government is offering 2,000,000 francs in prizes or premiums.

This competition is intended to encourage the production of aviation engines suitable for commercial planes and developing between 350 and 450 hp. It united 13 entries from Renault, Salmson, Breguet, Lorraine-Dietrich, Peugeot, Panhard-Levassor, Hispano-Suiza, Fiat, and the Farman companies.

After a five-hour preliminary test on the bench and a two-hour test in the air, the engines had to be put through an endurance test of 240 hours, in periods of eight hours, the whole not to occupy more than 100 days.

No great amount of enthusiasm appears to have been shown by the competitors to be the first to go on the bench, the thought evidently being that in an entirely new type of technical competition, with many detail points likely to be disputed, the one to open the trials would be at a disadvantage.

Although the machines had to be delivered at the French government aviation laboratory on Feb. 29, only two, a Farman and a Salmson, have accomplished their tests in the air, and the Farman is the only one to have entered on the final endurance test.

Under the rules the competitors are permanently eliminated if ten of the 30 tests are canceled, the causes of cancellation being: More than an hour late in starting, a penalized stop during the first four hours' running, any stop of more than one hour's duration, two penalized stops during any part of the trial and failure to maintain higher horsepower than the average shown in the elimination run.

Under the application of this stringent rule the Farman had ten of its trials canceled and consequently was ruled out of competition. The causes of the ten canceled trials were: Water jacket leak, ignition trouble, defective spark plugs on two occasions, water leak, plugs and ignition, five cracked pistons, broken piston, drop in oil pressure and cracked piston.

Farman Operates Normally

The Farman engine operated normally 184 hours, and in addition ran seven hours in the preliminary trials and 43 hours in canceled tests. Stripped and examined after this performance, the official report showed that it was in very satisfactory mechanical condition, the maximum piston clearance being 0.64 mm. and the maximum connecting rod and main bearing clearance being 0.20 mm.

The type of engine entered by Farman in these trials is a water-cooled W model with four valves per cylinder, operated by pushrods and rockers and having a geared down propeller. This engine is in regular production and is probably the most perfected of French engines of this class.

The Salmson should be the next engine to go on the bench. It is doubtful if some of the others will go through the trials. The Hispano-Suizas and the Fiat were withdrawn at the outset, and the Breguet doubtless will not start. The engine entered by Panhard-Levassor is a 12-cylinder V Knight type with white metaled sleeves.

May Stop Trials

In view of the length of time which has elapsed without any definite results being obtained, it is being asked whether the trials ever will be carried through to a completion and, if annulled, what use will be made of the 2,000,000 francs offered jointly by the government aviation department and the French Aviation Propaganda Committee.

State Enforces Law on Overladen Trucks

NEW YORK, Jan. 19—A drive has been started by the Motor Vehicle Bureau of this State to enforce the law against loading motor trucks in excess of their rated capacity. This campaign is in addition to the one started by the bureau in various parts of the State to force motorists to equip their cars with proper headlights, and has been inaugurated because of the heavy damage done to the highways by overladen trucks. Another reason for the more recent drive, it is said, is to check the diminishing of the license fee revenue.

In order to cope with the situation as adequately as possible, a device known as a loadmeter will be used by inspectors of the bureau. It weighs accurately and is easily carried in the runabout cars to be used for inspection. The loadmeter will be set on the roadway and trucks stopped will be run upon it. The results of the weighing will appear on the indicator.

All violations of the law and operators of overloaded trucks, or drivers of trucks operating under incorrect licenses, will be liable to severe punishment.

OLDS' CONDITION BETTER

DETROIT, Jan. 21—The condition of R. E. Olds, chairman of the board of the Reo Motor Car Co., who was stricken with scarlet fever while attending the New York automobile show, has been reported much improved by attending physicians. They hope to hold the case to a mild seizure. Mr. Olds was compelled to leave the National Automobile Chamber of Commerce dinner by the illness, which became acute while he was there.

Air Industry Asks Nation to Help It

Leaders at Government Investigation Say It Is Almost Prostrate

NEW YORK, Jan. 20—At the congressional inquiry into the national air services, held at the Waldorf-Astoria here, testimony was given to the effect that the aircraft industry is almost prostrate in this country through lack of government cooperation.

One of the principal witnesses was C. M. Keys, president of the Curtiss Airplane Motor Co., who testified that he "was losing interest in aviation." He added that "the job of being a contractor under the government is very unsatisfactory." His conclusion was that if things continue as they are "aircraft manufacture will be a government monopoly within two years."

Technical men who testified were unanimous in the belief that government action is necessary. When Congressman Randolph Perkins asked several if a direct subsidy was advisable, not one replied in the affirmative.

Grover C. Loening, president of the Loening Aeronautical Engineering Corp., who has been connected with the industry since 1910, said:

> In my opinion the first thing to be done to help commercial aviation is to provide it with insurance. Until the industry is legislated for under marine law, or under a code of its own, it is impossible for a passenger or shipper to sign away his liability rights and we cannot get liability insurance except under exorbitant rates.
>
> Perhaps the most practical way to achieve the insurance feature is to register commercial airplanes for possible military or naval service warfare. It could be changed over night into a war weapon with 80 per cent efficiency. Our mail service is the greatest commercial service in the world and it is operated by the Government, though most folks decry Government operation.
>
> Some say the Government is not a good business man, but I want to tell you the purchasing agents are sharp. The industry itself is to blame in making competitive bids at prices where a profit cannot be made. I would rather have each constructor specialize on his own type and the Government call upon him when that type was needed.
>
> We seem in this country to be highly gullible and willing to accept at face value highly colored reports of what they are doing in Europe. The fact is that we have the mechanical genius, the personnel and the materials to meet anything they do. I would be willing to back American planes, type for type, with anything they produce in Europe.

Commercial Aviation Favored

Lorillard Spencer of the Board of Trade and Transportation and president of the Atlantic Aircraft Corp. said he was one of the company which had taken over the Barling lumber, and it had cost him and his associates $528,000.

Francis H. Sisson, vice-president of the Guaranty Trust Co. of New York, said he favored commercial aviation.

U. S. Survey Shows Employment Gains

Conditions in Automotive Industry Reported as Getting Back to Normal

WASHINGTON, Jan. 21—Employment conditions in the automotive industry are gradually getting back to normal with most of the plants starting production again and the prospects for the future look much better than they have in the past.

This is the conclusion reached after a careful survey of employment reports made by the Department of Labor. Most of the reports reflect a spirit of optimism and predict definite improvement in the employment situation in the automobile industry within the next thirty days.

Following are concise reports by cities and States contained in the latest employment bulletin:

Massachusetts.—The rubber industry is working overtime in some parts of the State.

New York.—Automobile industries, which have shown little or no improvement during the last quarter of the year, are preparing to expand operations, and employment in this line will show a definite improvement within 30 days. During the closing weeks of the year, temporary lay-offs were reported in some automobile plants.

Buffalo, N. Y.—Employment decreased during December in the automobile industry.

Rochester, N. Y.—Plants manufacturing automobile accessories are working overtime.

Pennsylvania.—The automotive industry is showing signs of improvement.

Elgin, Ill.—Two large garages are under construction, to cost approximately $50,000.

South Bend, Ind.—The automobile plants are not taking on any additional men at this time, but are retaining their old hands.

New Castle, Ind.—Automobile and rubber plants are operating overtime.

Muncie, Ind.—Surplus of workers, particularly in the automobile industry. A large motor corporation is operating part time, affecting 500 men, and the majority of the other plants are working only from 50 to 75 per cent of the time.

Michigan.—A surplus of labor is apparent in some sections of this State, particularly in the automobile industry.

Detroit Industrial District.—Automobile accessory plants are operating on part-time schedules on account of seasonal slackening.

Grand Rapids, Mich.—An automobile body plant is operating part time affecting about 1000 workers.

Flint, Mich.—A large motor company put on an extra night shift this month; however, there are three motor companies operating only part time, affecting 18,500 employees. This is attributable in part to inventory taking. Employment conditions are gradually getting back to normal, most of the plants are starting production again, and prospects for the future look bright.

Kalamazoo, Mich.—A garage to cost $30,000 is under construction.

Lansing, Mich.—Surplus of automobile factory help. Automobile plants and factories producing parts for automobiles are operating part time.

Cleveland.—An improvement in automobile plants is apparent by the increased demand for certain classes of skilled help.

Toledo.—There is a surplus in help in automobile and automobile accessory plants.

Akron.—All the large rubber factories are working three eight-hour shifts and the smaller ones two ten-hour shifts.

Fremont, Ohio.—Automobile accessory plants are operating on part time, and there is a surplus of labor apparent.

Ford Pronounces Water Shipments a Success

DETROIT, Jan. 19—Operation of the Ford steamship Oneida has demonstrated the feasibility and economy of shipping automobile parts from Detroit to southern and southwestern ports by rail and water, rather than by all rail routes, Ford Motor Co. declares. Parts for approximately 3000 automobiles, the equivalent of 125 freight carloads, were carried on the maiden ocean voyage.

About two-thirds of the cargo carried was delivered at the Jacksonville and New Orleans plants, and an additional cargo of 80 closed car bodies was picked up at New Orleans for the Houston plant. The New Orleans plant assembles closed bodies for Houston. Commercial cargo bound for Houston was also taken aboard at New Orleans. The Oneida carried 1650 tons of sugar as a commercial cargo on her return trip to New York.

The Onondaga, arriving in Buenos Aires Dec. 17, carried parts to make up 3000 cars. It is now on its homeward trip, carrying a commercial cargo. Both ships have Norfolk as their home ports.

Ford Exports 2000 Tractors to Russia

DETROIT, Jan. 20—Ford Motor Co. reports a shipment of approximately 2000 tractors into Russia, the shipment also including a large stock of parts for service. Checks given in payment totaled nearly $1,000,000. One-third of these were consigned to Odessa and the remainder to Novorossisk. This is the second large shipment of tractors the company has sold into Russia, the first being last August, when 900 tractors were delivered.

Martin-Parry Plans to Double Its Capital

YORK, PA., Jan. 21—F. H. Small, president of the Martin-Parry Corp., has asked stockholders to vote Jan. 26 on a proposal to increase the authorized capital stock from 100,000 to 200,000 shares. It is expected that part of the increased stock will be offered to stockholders.

"The company is constantly taking on new business," says Mr. Small. He continued: "It seems wise to your directors to make provision at this time so that some of the former improvements in its development may be capitalized and that the stockholders may have an opportunity of adding to the capital of the company for its future developments.

Ford Increases Space 40 Per Cent in Year

Company Started 1925 with Total of 20,500,000 Sq. Ft. Under Roof

DETROIT, Jan. 21—Going into the new year, Ford Motor Co. now has a total of 20,500,000 sq. ft. of industrial space under roof, 6,000,000 ft., or about 40 per cent, having been added in the year just closed. A large part of the additional space is made up of new assembly and manufacturing buildings under construction or just completed at ten of the branch properties.

Three assembly plants were built or are nearing completion at points where there were formerly no assembly facilities. These are at Jacksonville, Fla.; Norfolk, Va., and Charlotte, N. C. New plants were built or are nearing completion at Memphis, Tenn.; Dallas, Tex., and Louisville, Ky. An addition was made to the branch at Oklahoma City to permit building of bodies and a new sales and service building was added at Salt Lake City. This building program was carried out in conformity with a new policy of standardizing of assembly plants making equipment interchangeable.

Chief of the new industries established were the wood distillation plant at Iron Mountain, Mich., and the cement plant at River Rouge. The expansion program at River Rouge adds 1,700,000 ft. of floor space. A large addition was made to the wheel plant at Hamilton, Ohio.

Through improvements in industrial methods the company will save 32,500 tons of steel yearly and 100,000,000 board ft. of lumber, due in both cases to improved cutting and in the latter also to improved lumbering practice. Power developments during the year included the completion of hydroelectric plants at St. Paul and Iron Mountain, and the completion of plans for a small unit at Ypsilanti, this State.

Expansion Abroad

Expansion in foreign countries included the establishment of branches at Santiago, Chile; Rotterdam, Holland, and Stockholm, Sweden. The new plant at Copenhagen, officially opened Nov. 15, has assembly capacity for 600 cars and trucks daily. It is the second largest foreign factory of the company and includes in its territory part of Germany and the Scandinavian and Baltic States.

The new Charlotte, N. C., branch is the first completely standardized assembly plant in the United States. Five others of this type are building at points indicated and also at Norfolk, Va. Though production of this plant and of the new type standardized plant is set at a definite figure, based upon the estimated demand of the territory, this production can be quickly expanded according to prearranged plans.

Men of the Industry and What They Are Doing

Mossberg Made President

Frank Mossberg, formerly connected with the Frank Mossberg Co., Attleboro, Mass., is now president of the Mossberg Pressed Steel Corp. of the same city. The company makes pressed steel products for the textile and wire trades. Mr. Mossberg is no longer interested in the automotive field, but the Frank Mossberg Co. is continuing the manufacture of products that it has always made.

Bolton Succeeds McCormick

A. L. McCormick, for many years general manager of the Paige Sales & Service Co., distributor of Paige-Jewett cars in Detroit, has resigned. At the time of his resignation Mr. McCormick was president of the Detroit Automobile Dealers Association and is widely known for his association activities. Mr. McCormick is also the holder of patent rights on the rubber windshield weather strip used almost universally as equipment on two-piece shields. Mr. McCormick has not announced his future plans. He is succeeded at the branch by S. D. Bolton.

W. E. Cook Here from Paris

W. E. Cook of the Paris branch of North East Service, Inc., has arrived in this country, and after spending some time at the factory of the North East Electric Co. will return to Paris to spend a month before leaving for a trip through South Africa in the interest of the service.

Olwell Becomes Bank Official

Lee E. Olwell, formerly vice-president and sales manager of the Chalmers Motor Car Co., Detroit, has assumed new duties as a vice-president of the National City Bank of New York. Mr. Olwell was born near Milwaukee, where he attended school. He entered the advertising business in Chicago and after three years as advertising manager of the National Cash Register Co. joined the Chalmers organization, later going to the National City organization as assistant to C. E. Mitchell, president.

Miller Succeeds Thornton

L. T. Miller has been appointed purchasing agent of Detroit Steel Products Co., in which position he succeeds T. F. Thornton, who resigned recently to take the presidency of the Roehm Steel Rolling Mills. Mr. Miller is widely known in the purchasing field in the industry, coming to Steel Products from Chevrolet Motor Co. and being formerly connected with Continental Motors Corp. and Elgin Motor Car Co.

Heiskell Goes to Europe

A. R. Heiskell, vice-president of the Nordyke & Marmon Co., sailed from New York Jan. 17 on the S.S. President Roosevelt for a brief trip to London and Paris. In London Mr. Heiskell will confer with Frank Hambly, foreign representative of the Nordyke & Marmon Co., for the purpose of consolidating various export negotiations which Mr. Hambly has arranged. Nordyke & Marmon Co. report a growing interest of foreign automotive dealers in the new Marmon models which were announced in November.

Hubbs Made Ajax Sales Manager

C. W. Nash, president of the Nash Motors Co., has announced his selection of George C. Hubbs as general sales manager of the Ajax Motors Co., Racine, the new Nash subsidiary. Mr. Hubbs has been assistant sales manager for Dodge Brothers and gained a record for himself in handling the introductory campaign for the United States Tire Co. several years ago.

Hill Goes with Valentine Co.

L. Clayton Hill, for the past five years assistant general manager of the Society of Automotive Engineers, has joined the staff of the Valentine Co. to take charge of automotive sales for the Detroit district. Mr. Hill has had a long association with the industry, much of his work having involved body design and construction work. In 1912 he joined the engineering staff of the Packard Motor Car Co. as engine designer, and in 1917 became body engineer of the same organization. With the entrance of the United States into the world war he became a member of the advisory committee, which designed a standardized ambulance body for the army. Later he became engineer, aviation division, Packard Motor Car Co., working with Capt. Georges Lepere of the French Aviation Mission. In 1919 Mr. Hill joined Capt. Lepere in the Franco-American Engineering Co., specializing on engine and chassis design. Following a brief period in consulting engineering work, he joined the staff of the S. A. E. in 1920.

Elix Joins American Body

George T. P. Elix has resigned as chief engineer of the C. H. Wilson Body Co., Detroit, and will join the American Body Co., Buffalo. O. J. Crowe, who has been associated with the Wilson Body Co. in the purchasing department, goes with Mr. Elix as director of purchases for the Buffalo concern.

Whittaker Made Hudson Director

Joseph H. Whittaker has been elected a director of the Hudson Motor Car Co., to succeed E. E. Staub, who resigned. Other directors were reelected.

Smith Goes with Edmunds & Jones

Lon R. Smith, well known sales executive, has been appointed manager of the replacement sales division of the Edmunds & Jones Corp.

Accessory Business Picks Up in South

Sales Volume in New Year Has Been Much Better Than in 1923

ATLANTA, GA., Jan. 20—According to a report by two of the South's largest jobbers of accessories and parts in Atlanta, sales have opened up so far this year with a promise that 1925 business the first two or three months will be unusually good in accessory lines, although a fair amount of the new business that has been booked the past two weeks by retailers has been to replenish their stocks, which were apparently largely depleted by the Christmas business they enjoyed.

To date the sales volume so far has been considerably better than the corresponding period last year, with salesmen covering the territory reporting to headquarters that the outlook is for continued good business through the rest of the winter and well into the spring months.

Dealers are still practising the policy of hand-to-mouth buying, however, purchasing in smaller quantities and more often than usual, but to some extent are getting away from this practice as the outlook improves.

While this is affecting current sales of jobbers to some extent, business in the long run, they report, is exceptionally good for this season of the year.

Motor Truck Industries Elects Hayes President

DETROIT, Jan. 19 — O. W. Hayes, president of Republic Motor Truck Co., Inc., was elected president of Motor Truck Industries, Inc., at the meeting in Lima, Ohio, the first in its plan of holding meetings in the individual members' cities. The other officers are C. J. Helm, Acme Motor Truck Co., first vice-president, and B. A. Gramm, Gramm & Kincaid Motors, Inc., secretary and treasurer.

In Lima the members of the association were guests of the Garford Motor Truck Co. and Gramm & Kincaid Motors, Inc. Luncheon was served at the Argonne Hotel. Following the meeting the association visited the Garford plant and several body building plants in the city, where they studied design and manufacturing methods.

The February meeting will be held at the Hotel Statler, Buffalo, where the association will be entertained by the Stewart Motor Corp. and Atterbury Motor Car Co. The date of the meeting is Feb. 18.

British 1925 Market to Continue Open

American Automobiles Not to Be Affected This Year by Tariff Act

LONDON, Jan. 12 (*by mail*)—The Conservative government has lost no time in announcing that a new safeguarding of Industries Bill will be introduced in 1925. The Liberal journals designate the proposals as a general tariff in disguise.

At first sight this seems as if the import duty on automobiles will be reinstituted. But Stanley Baldwin's party was routed when it declared itself all out for a protectionist policy in November, 1923, coming back last October by announcing a middle course.

The Premier now has announced his intention of re-introducing safeguarding measures that will put more firmly on their feet British industries affected by the abrogation of the duties last August.

If there is sincerity in Mr. Baldwin's announcement that no trade will be tinkered with if it is proved that it has prospered since the Snowden act came into force, no fair action can be taken to enforce duties on imported motor cars at the present juncture.

It is evident that the British motor industry is stronger now than ever it was. From all manufacturing centers comes the news that trade is booming, both as to home and overseas demands.

Motor Industry Stronger

It is believed that the government will bring all its forces to bear in attempting to prove that, despite the jump forward of the automobile industry after the Snowden spur, it would be still more prosperous if protectionist measures were again brought to bear.

Morris is stated to have given an order recently for 1,000,000 spring gaiters. Austins has a bulging order book, while a number of other firms are working at such high pressure that in some cases night shifts have been put to work.

The motor trade will have to prove, on the known suggested lines of the new act, that the industry is efficient, of substantial importance, and subject to exceptional competition. It is probable preference will be granted to the dominions.

Competing Factors

Lower wages, longer working hours, and possibly heavier taxation in a competing foreign industry might be taken into account as unfair competition. The United States will hardly come into these categories, but as the ultimate tariff raise will be general, American manufacturers must become affected, whichever way matters go.

It is not believed that a good case will be made out regarding the dumping on this market of American and other foreign cars. Dealers nearly all tell the same story as to relative demands. One even goes so far as to declare that he thought the nation was going motor mad, most of his business being done in light British cars sold to comparatively poor men whose initial deposit of £50 or so can only be backed up by surplus earnings from more or less permanent employment.

Such buyers, who must not only buy but maintain out of income, cannot possibly look at American cars.

The 10 h.p. four-seater phaeton, which, with its improved hood and side curtains is so readily turned into a reliable all-weather vehicle, is capable of coping with British road conditions.

American cars continue, however, to sell well with a clientele whose incomes range between £750-£1,000 per annum.

Continental Motors Starts New Campaign

DETROIT, Jan. 19—At a meeting of the directors at which the regular quarterly dividend at the annual rate of 80 cents a share was declared, President R. W. Judson of Continental Motors Corp. announced plans for the ensuing year, including an aggressive campaign for business in the agricultural, industrial and marine fields.

"These three industries are rapidly becoming motorized," said Mr. Judson, "and as we are essentially a motor building organization we plan to increase greatly our business along these lines. Continental motors are now being used in motorized equipment of every conceivable sort and indications point to a rapidly growing business in this field."

The dividend is payable Jan. 30 to stock of record Jan. 31.

Glidden Nets $2,019,364 in 1924 Fiscal Year

NEW YORK, Jan. 20—Gross sales of $19,614,396 were reported by the Glidden Co. for the year ended Oct. 31, 1924, against $19,372,277 in the previous year, and operating profits of $2,019,364, against $2,096,085. After interest charges and taxes there was a net profit of $1,078,906, compared with $1,116,502 in the previous year. As of Oct. 31, 1924, the balance sheet showed a profit and loss surplus of $3,084,803, as against $3,178,689 on the same date the previous year, the decrease being due chiefly to adjustment of accumulated dividends on the old preferred stock.

In a statement to stockholders, Adrian D. Joyce, the president, said the paint business naturally was affected by a general depression in the second and third quarters of 1924. However, the company finished the fiscal year with an increase in sales, because of an aggressive sales policy and new lines of products, he stated.

FINANCIAL NOTES

Paige Detroit Motor Car Co. common stock to the amount of 800,000 shares, par value $10, has been admitted to trading by the New York Curb Market Association. The initial sale was made at 18, after which the stock advanced to 19. The company's 6½ per cent serial gold bonds, $2,500,000 principal amount, were also added to the list.

Paige Detroit Motor Car Co. directors have recommended changing the present 600,000 shares of $10 per common stock to no par stock and the issue of 200,000 shares additional no par common stock to be held in the treasury for future use. No action was taken on the expected 33⅓ stock dividend.

Fisher Body Corp. temporary certificates for $60,000,000 common stock of $25 par has been admitted to the New York Stock Exchange list, on official notice of issuance in exchange for the outstanding common stock of no par value.

Fisher Body no par common stock transactions may be settled by delivery of either certificates of no par, or the equivalent in $25 par certificates, according to a ruling made by the New York Stock Exchange.

Hayes Wheel Co. has called for payment, Feb. 1, 1925, at 102½ and interest, $108,800 of its first series A 7s and B 6s, due Feb. 1, 1929, at the offices of Lee, Higginson & Co., New York, Boston and Chicago.

Apco Manufacturing Co. Class A $25 par stock "when issued," the amount of 50,000 shares, has been admitted to trading by the New York Curb Market Association.

Fisk Rubber Co. has declared a dividend of $1 on the first preferred stock, payable Feb. 2 to stock of record Jan. 26. No dividend has been paid since May 1, 1921.

Hudson Motor Car Co. has declared the regular quarterly dividend of 75 cents, payable April 1 to stock of record March 15.

Sees 1925 Bus Sales Twice Those of 1924

NEW YORK, Jan. 19—Sixty-five per cent of the buses built in 1924 by the International Motor Co. were bought by railroads and electric railroads, according to an announcement made by R. A. Hauer, manager bus department of that company. Speaking of prospects for 1925, Mr. Hauer says:

It has been heard from reliable sources that since the first of 1924 as many as 1500 new bus lines began operation in this country and that 5400 buses representing an approximate cost of $30,000,000 were purchased.

Indications are that our production and sale of Mack buses during the current year will more than double the record made in 1924.

Our sales for the first few days of the year have given conclusive evidence that we now are entering an era of great prosperity and progress.

COURT UPHOLDS CHAMPION

TOLEDO, Jan. 20—The Champion Spark Plug Co. has been sustained in its contention against the S. S. Kresge Co. for alleged patent infringement in sale of spark plugs, according to a decision handed down by the United States Circuit Court of Appeals. The court held, however, that the five-and-ten-cent store company could not be restrained from selling spark plugs, but should not use any reference to lead customers to believe they were the product turned out by the complainant.

Texas in 1924 Sells 176,000 New Cars

Automotive Business Transacted in State Is Placed at Total of $236,000,000

DALLAS, Jan. 20—The number of new automobiles sold in Texas in 1924 passed the 176,000 mark, according to reports received in Dallas from the State registration office. It is probable the total will reach 185,000, because a considerable number of those sold evaded the laws requiring registration.

The value of the new cars sold in the State during the year was a little more than $176,000,000, according to estimates of leading automobile men. Dealers state the average prices of cars sold was above $1,000.

While no exact figures are available, it is estimated that 200,000 used cars changed hands during the year. The licensed automobile dealers claim 70 per cent of the new car business was done on the trade basis. These dealers have disposed of the great majority of the used cars they took in on sales.

In Texas there are hundreds of dealers who handle nothing but used cars. Well informed automobile men state such sales will be sufficient to push the total of used car sales well over the 200,000 mark. It is estimated that the average price of used cars was $300, which would make their total value $60,000,000 and bring the retail value of the automobiles sold in Texas during 1924 to $236,000,000.

15,000 Trucks Sold

In addition to automobiles, there were 15,000 trucks sold during the year and probably 1000 trailers. The retail value of these is about $26,000,000.

Wholesale tire distributors estimate the retail value of automobile tires sold in the State as over $85,000,000. The total accessory parts and inner tube business amounted to about $50,000,000.

The year was the best in the history of the automotive business in Texas. Dealers are inclined to believe that the trade in 1925 will be better than in 1924. They expect a considerable increase in the sale of medium-priced closed cars and a bigger business in the rural districts. The business during the first half of January was brisk in all lines.

The number of motor vehicles registered in Texas is more than 800,000, giving the State sixth rank in the nation. Registration fees amounted to $17,000,000.

COMET MEN FINED

DECATUR, ILL., Jan. 19—John A. Scribbens, Irving Cowles and C. E. Uhler, members of the reorganization committee of the Comet Automobile Co., which was organized here eight years ago, and who were indicted in June, 1924, by the Federal grand jury along with other former officers, salesmen and members of the reorganization committee, on the charge of misuse of the mails and making false statements, pleaded "nolo contendere" before Judge Louis Fitz Henry and were fined $750 each.

INDUSTRIAL NOTES

Stewart Warner Speedometer Corp's manufacturing program, based on unfilled orders, shows a 50 per cent increase on speedometers and a gain of 60 per cent on vacuum tanks over the actual daily production on these items the last half of 1924. Electrical Research Laboratories announces the receipt of contracts from the Stewart Warner Speedometer Corp. covering various types of apparatus employed in complete radio receivers soon to be placed on the market by the latter. The principal items scheduled are variable condensers, transformers, rheostats and potentiometers in quantities.

Truck Operating Plan Sought by Norfolk

NORFOLK, VA., Jan. 19—The city of Norfolk is in the market immediately for some plan whereby it can cut down the cost of operating its fleet of 110 automobiles and trucks. The cost of operation last year amounted to $80,000, exclusive of depreciation and equipment, and City Engineer W. B. Causey has been instructed by the city council to cut $15,000 off that cost at once. He has proceeded to cut out 16 passenger cars, but is looking for some better plan.

Norfolk maintains its own supply and repair station, each department of the city paying there for service and supplies on its own vehicles. The system long has been a source of complaint.

It has been suggested that the installation of uniform motor equipment might be a partial solution of the problem, as the city uses practically every type of car of the lower and middle-priced grade.

Lower Priced Airplanes Planned by Australia

NEW YORK, Jan. 21—According to a dispatch received by J. A. M. Elder, Australian High Commissioner to the United States from the Department of Labor and Industry of the New South Wales government, airplanes that will cost less than $1,500 and will be as easily handled will be placed on the Australian market within a few years.

STORE FINANCES SALES

NEW YORK, Jan. 20—Bloomingdale Bros., a large department store here, has opened an automobile division for the purpose of financing automobile sales. It has a practical rate chart which, by key letters and a deduction list, enables the salesman to tell at a glance the rate for any particular make of car. The department is in charge of Irving Cole, who has been in the automobile finance business ten years.

METAL MARKETS

Specifications from automotive steel consumers who contracted for their January and February requirements at the low price levels in vogue last November are coming forward at a heavy rate. There is also a certain amount of new business coming into the market, but the tonnages involved are not very impressive.

So far at least there is no indication of a new buying wave that would furnish a prop for higher prices. Buyers are moving no more cautiously than producers, the latter waiting for the placing of considerably more business before seriously thinking of going up on their asking prices, while the former are buying from hand to mouth, seemingly not quite so perturbed about protecting themselves against rising prices as they were late in December.

No large additional orders for full-finished automobile sheets appear to have been placed, but the market for this specialty has hardened decidedly under the influence of the stiffer prices asked for sheet bars. Quite a few of the non-integrated sheet rollers can see the end of their $37 supply and with the market for this semi-finished material now firmly established on a $40 basis and mills seemingly not eager for much business even at that level, the sheet manfacturers are turning a deaf ear to purchasing agents who say they might be tempted to place heavy orders if they could save a little money by doing so.

While the steel market in general may be characterized as steady to firm, there is quite a difference between the tone of the Chicago and that of the Pittsburgh market. The sentiment in Chicago is far more bullish than in Pittsburgh, where much more cautiousness is in evidence. The differential between the two markets may, therefore be slightly enlarged on some products.

There are those who now see two movements in the steel market—a major and a minor one. The major movement, they assert, is certainly not in the direction of higher prices and will be spread over the entire year and probably several years to follow.

Of minor intervening movements, such as the present one, they aver, there may be many to interrupt temporarily the major trend. The uncertainty lies in the length of the duration of these movements. On this score the prophets are profoundly silent.

Pig Iron—Although the market is dull, here and there one hears of higher quotations. These, however, are strictly asking prices, and no transactions at these higher levels are noted. Automotive foundries appear to be well supplied and have considerable tonnages due them on old contracts.

Aluminum—Recent shipments of rolled aluminum to England have caused some wonderment as to whether there has been a change in the cordial relations which existed previously among the world's producers. The shipments, of course, were light, but while Europe hasn't very much aluminum for export at this time, it would come as a surprise to learn that she must import part of her own requirements. The market is unchanged, secondary and scrap metal being eagerly sought at high price levels.

Copper—The market for the red metal has turned easier, but prices for automotive brasses and copper products hold steady.

Workers Guard Against Excessive Stocking

WASHINGTON, Jan. 19—A precaution by automobile manufacturers against excess stocking of both their own and dealers' warehouses is the outstanding note of the automobile industry as reflected in the January survey made by the Federal Reserve Board.

Internal revenue figures of taxes paid on automobile sales in November totaled less than 50 per cent of those paid in the same month of 1923.

The market for raw rubber has been active, and the price has renewed its rapid advance, which was temporarily checked in November, reaching in December the highest in the three years.

Calendar

SHOWS

Jan.. 23-31 — Chicago, National Automobile Show, under the auspices of the National Automobile Chamber of Commerce. Coliseum and First Regiment Armory. Open to the public except on Jan. 23 and 24, which are trade days.

Jan. 25-31 — Chicago Annual Automobile Salon.

Feb. 7-14—Kansas City, Mo., Annual Automobile Show.

Feb. 9-14—New York, Eleventh National Motorcycle, Bicycle and Accessory Show, Seventy - first Regiment Armory, under the auspices of the Motorcycle and Allied Trades Association.

Feb. 21-28—San Francisco, Pacific Annual Automobile Show.

March 7-14—Boston, Twenty-third Annual Automobile Show.

March 8-14 — Vienna, Spring Fair.

March 20-29—Geneva, Switzerland, Second Swiss International Motor Exhibition.

April 1-17—Sydney, Australia, Royal Agricultural Show. Embraces automobile exhibits.

April 22-May 7 — Melbourne, Australia, International Automobile Show, under the auspices of the Chamber of Automotive Industries, in conjunction with the Royal Automobile Club of Victoria.

June—Rio de Janeiro, Brazil, Rio Automobile Show, originally scheduled for October, 1924, but postponed for more extensive arrangements.

RACES

July 26—Paris, Montlhery Track, French Grand Prix.

CONVENTIONS

Jan. 26-29—Chicago, Eighth Annual Convention of the National Automobile Dealers Association, Hotel LaSalle.

June 22-27—Summer convention of the Automotive Equipment Association at the Broadmoor Hotel, Colorado Springs, Colo.

S. A. E. MEETINGS

Feb.—Indiana Section, Automobile Finishes.

Feb. 16—Cleveland Section, Electrical Instruments and Measuring of Chassis Tests by Means of Them, J. H. Hunt, General Motors Research Corp., Old Colony Club, Cleveland.

March—Indiana Section Developments in Transmission.

March 16 — Cleveland Section, Road and Riding Ability, Harry Horning, Waukesha Motor Co., Old Colony Club, Hotel Cleveland.

April 9—Indiana Section, Talk by F. E. Hunt, head of electrical division, General Motors Research Corp.

New Record Made in Gasoline Output

WASHINGTON, Jan. 19—A rate of 25,400,000 gal. per day of gasoline production was maintained in the United States during the month of November last, constituting the highest daily average output ever recorded, the Department of the Interior has just announced in a review of statistics compiled by the bureau of mines.

The month's production figure of 762,046,475 gal. represents an increase of 1,500,000 gal. over the high production figures of October. November being one of the shortest months, the total production figure fell 17,000,000 gal. below the high record production figures for May, 1924.

Domestic demand or consumption of gasoline during November amounted to 695,359,199 gal., a daily average of 23,200,000 gal., and an increase of 29.1 per cent in daily consumption over the November, 1923, period. This represents a decrease in the rate of consumption of gasoline from the previous month of approximately 1,000,000 gal. per day, or 4.4 per cent.

The figure compares with a drop of 12.9 per cent during the same period a year ago, and indicates a more sustained use of motor vehicles in the winter months of 1924 than in those of 1923. Exports of gasoline increased slightly during the month, amounting to 98,000,000 gal.

Stocks of gasoline on hand at refineries on Dec. 1 amounted to 1,133,168,656 gal., a decline of 19,000,000 gal. during November. This is the lowest gasoline stock figure recorded since Jan. 1, 1924. These stocks represent 48 days' supply at the current rate of domestic demand, comparing with 55 days' supply on hand a year previous and 47 days' supply as of Nov. 1.

During November the bureau of mines received reports from 280 refineries, with an aggregate daily crude oil capacity of 2,313,627 barrels, running to stills a daily average of 1,834,306 barrels of both foreign and domestic crude oil, of 79.3 per cent of their daily operating capacity.

This represents an increase of 1.5 per cent over the refinery operations of the previous month and an increase of 0.3 per cent over the operations of November, 1923.

Street Car Losses Laid to Use of Automobiles

WASHINGTON, Jan. 21—Increased use of private automobiles is given here by the public utilities commission as the reason for the decline in street car passengers which has been going on gradually for some time past.

Reports just filed with the public utilities commission covering operations during December show that both local street railway systems sustained losses in passengers carried, as compared with the same month of 1923. The figures show that the Capital Traction Co. had a heavier loss than the Washington Railway and Electric Co.

The Capital Traction Co. carried in December 5,242,686 passengers, a reduction of 277,915 from December, 1923.

The Washington Railway and Electric Co. carried 5,838,463 passengers and lost 244,849, as compared with the same month a year ago.

Increase Shown in U. S. Imports Into France

WASHINGTON, Jan. 19 — French imports for the first eight months of 1924 included 8384 passenger cars and 87 trucks, as compared with 6,301 and 68 respectively for the corresponding period of 1923, according to figures sent the Department of Commerce.

Of the total imports 7442 passenger cars were from the United States. Great Britain did the major portion of the truck business, shipping 50 vehicles to that country the first eight months of this year.

Exports during the same period from France were 28,376 cars and 2815 trucks, against 17,801 cars and 1576 trucks exported the first eight months of last year.

Corporations Pay $35,564,913 Taxes

WASHINGTON, Jan. 21—Out of 1075 automotive corporations filing income tax returns for the calendar year ended Dec. 31, 1922, 430 of them paid an income and profits tax of $35,564,913 on a net income of $314,950,079, which was more than one-third of the $906,956,106 paid by all manufacturers in the metal manufacturing group in which automotive products were classed.

These facts have just been made public here in a report of the bureau of internal revenue. Included in the automotive corporations are those manufacturing motor vehicles, automobile and truck bodies and spare parts.

A total of 645 automotive corporations, according to the bureau, reported no net income and a total deficit of $56,339,439.

Detailed statistics of the sources of income among corporations disclosed that the manufacturing interests earned a net taxable income for the year of $3,454,419,673.

Out of 39 airplane corporations 16 reported a net income totaling $123,107, while 23 reported no net taxable income with an avowed deficit of $699,480.

The report further shows returns were filed by 382,883 corporations in 1922 and 356,397 in 1921. The total incomes of 212,535 corporations in 1922 was $6,963,811,143. They paid taxes of $775,310,154. They also paid excess profits taxes of $8,466,114 on net incomes earned from July 1, 1921, to Dec. 31, 1921, making a total tax of $783,776,268. For 1921 the corporations paid income taxes aggregating $701,575,432.

A CORRECTION

NEW YORK, Jan. 21—As the result of an error, it was stated in the Jan. 1 issue that the main bearings used in the new Overland and Willys-Knight six-cylinder models and in the Jewett engine were of the Chadwick type. The bearings used in these engines are the close limit interchangeable type manufactured by the Federal Mogul Corp.